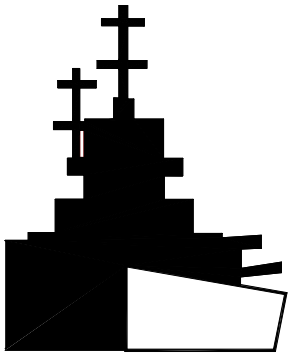
Bechtel Environmental, Inc.

NAVY CLEAN 3 PROGRAM



FINAL ANNUAL GROUNDWATER MONITORING REPORT FOR PETROLEUM-ONLY SITES NAVAL AIR FACILITY EL CENTRO EL CENTRO, CALIFORNIA

CTO-0043/0128
October 2005

Submitted to:

Naval Facilities Engineering Command Southwest
1220 Pacific Highway
San Diego, California 92132-5190

Naval Facilities Engineering Command Southwest
Contracts Department
1220 Pacific Highway
San Diego, California 92132-5190

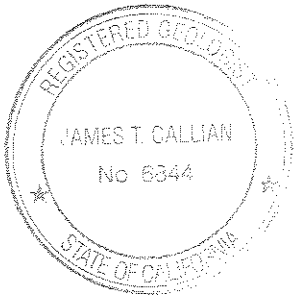
Contract No. N68711-95-D-7526

COMPREHENSIVE LONG-TERM ENVIRONMENTAL ACTION NAVY

CLEAN 3

FINAL ANNUAL GROUNDWATER MONITORING REPORT FOR PETROLEUM-ONLY SITES NAVAL AIR FACILITY EL CENTRO EL CENTRO, CALIFORNIA

CTO-0043/0128
October 2005



Prepared by:

BECHTEL ENVIRONMENTAL, INC.
1230 Columbia Street, Suite 400
San Diego, California 92101-8502

Signature: James T. Callian Date: 10/25/2005
James T. Callian, PG 6844, CTO Leader

TABLE OF CONTENTS

Section Page

APPENDICES

Appendix

FIGURES

Figure

Table of Contents

TABLES

This page left blank intentionally

ACRONYMS/ABBREVIATIONS

bgs	below ground surface
CLEAN	Comprehensive Long-Term Environmental Action Navy
COC	chemical of concern
CTO	contract task order
DCA	dichloroethane
DQO	data quality objective
°F	degrees Fahrenheit
µg/L	micrograms per liter
MCL	maximum contaminant level
mg/L	milligrams per liter
MTBE	methyl tert-butyl ether
NAF	Naval Air Facility
NEESA	Naval Energy and Environmental Support Activity
NEX	Navy Exchange
PG	Professional Geologist
QC	quality control
RWQCB	(California) Regional Water Quality Control Board
TPH	total petroleum hydrocarbons
UST	underground storage tank

This page left blank intentionally

Section 1
INTRODUCTION

This Annual Groundwater Monitoring Report discusses groundwater monitoring conducted during 2002, 2003, and 2004 at the petroleum-only sites at Naval Air Facility (NAF) El Centro, Imperial County, California (Figure 1-1). Bechtel Environmental, Inc., prepared this report for Naval Facilities Engineering Command Southwest. Monitoring was conducted under Contract Task Order 0043, issued under the Comprehensive Long-Term Environmental Action Navy (CLEAN) 3 Program, Contract No. N68711-95-D-7526. Work was performed in accordance with the Work Plan (BNI 2000b), the Groundwater Monitoring Plan/Field Sampling Plan (BNI 2000c), and the Technical Memorandum for Groundwater Sampling (BEI 2002).

The NAF El Centro environmental program includes locating, removing, assessing, and cleaning up contamination from petroleum-only sites, which include former underground storage tank (UST) sites.

1.1 SCOPE

This report presents the results of groundwater monitoring events conducted during 2002, 2003, and 2004 at UST Sites 116, 533, 539, and 200 (Navy Exchange [NEX] Gas Station) (Figure 1-2). Monitoring activities included measuring water levels and collecting groundwater samples for laboratory analysis. Detailed analyses of concentration trends and evaluations of data quality objectives (DQOs) are addressed in this report.

1.2 PURPOSE

Monitoring activities were conducted to:

- evaluate seasonal variations in groundwater flow direction and gradient,
- evaluate trends in groundwater quality, and
- assess possible releases resulting from past operations at NAF El Centro.

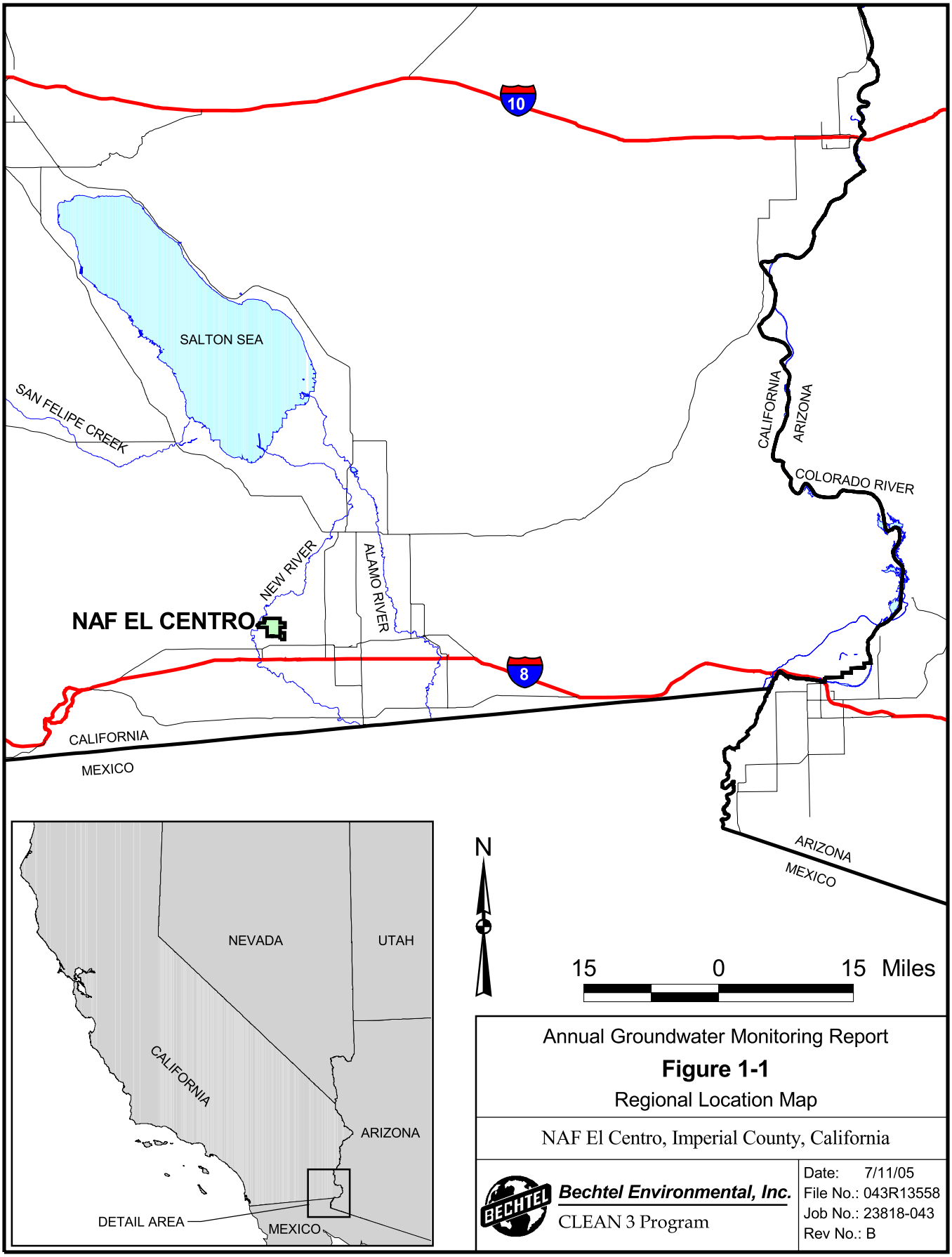
Groundwater data are being collected to evaluate groundwater conditions, address data gaps, and implement a long-term monitoring program to facilitate site closure. Specifically, the following activities are being conducted (BNI 2000b):

- evaluate the need for long-term monitoring and identify potential data gaps in the current monitoring well network
- collect groundwater samples at the frequency specified in the Groundwater Monitoring Plan/Field Sampling Plan (BNI 2000c)
- prepare monitoring reports following sampling events

1.3 REPORT ORGANIZATION

This report is organized as follows.

- Section 2 summarizes facility and site history information and the environmental setting.



Annual Groundwater Monitoring Report

Figure 1-1

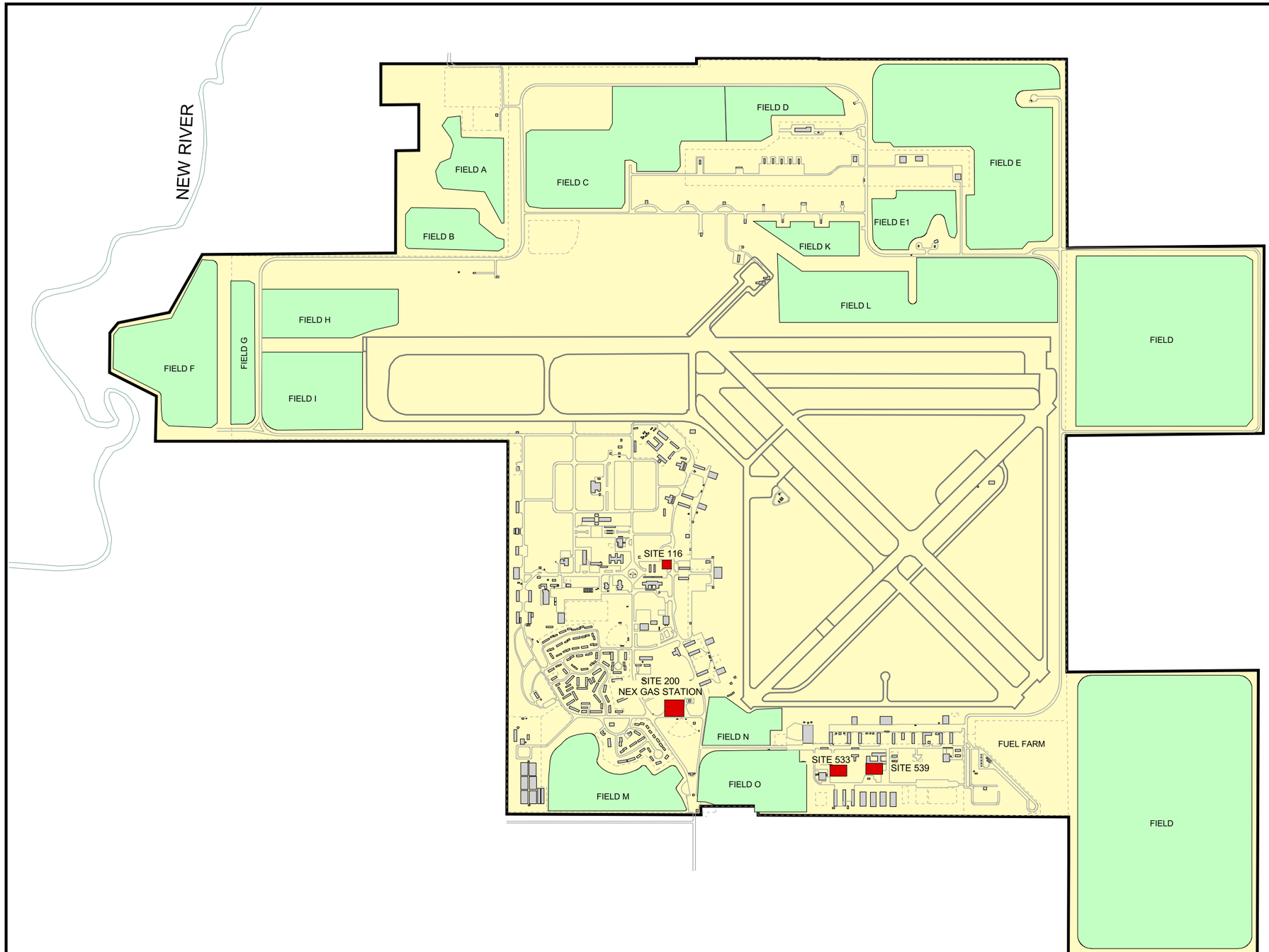
Regional Location Map

NAF El Centro, Imperial County, California

Bechtel Environmental, Inc.

CLEAN 3 Program

Date: 7/11/05
File No.: 043R13558
Job No.: 23818-043
Rev No.: B



LEGEND

- NAF EL CENTRO BOUNDARY
- IRRIGATED LAND
- SITE LOCATION
- RUNWAY
- ROAD
- FENCE
- BUILDING

NOTE:

NAF - NAVAL AIR FACILITY

N

1500 0 1500 Feet

Annual Groundwater Monitoring Report

Figure 1-2

Site Location Map

NAF El Centro, Imperial County, California

Bechtel Environmental, Inc.
CLEAN 3 Program

Date: 10/21/05
File No.: 043R13559
Job No.: 23818-043
Rev No.: D

Reserved for Figure 1-2 (11 × 17) page 2 of 2

- Section 3 describes the technical approach and DQOs.
- Section 4 presents the methodology and procedures applied to the evaluation of analytical data.
- Section 5 summarizes analytical results from groundwater monitoring conducted during 2002, 2003, and 2004.
- Section 6 lists the references cited in this report.
- Appendices A through F contain supporting documentation: data collection methods, well sampling logs, laboratory analytical results, chain-of-custody documentation, data validation reports, and tank closure summaries. Appendices B through F are included on compact disk.

This page left blank intentionally

Section 2
BACKGROUND

This section describes general activities conducted at NAF El Centro, background information for each site, and physical characteristics of the facility.

2.1 FACILITY HISTORY

NAF El Centro is an operational naval facility located in Imperial County approximately 7 miles northwest of the city of El Centro, California (Figure 1-1). The facility has been in operation since 1942 and is currently occupied by approximately 600 officers, enlisted personnel, and civilians.

NAF El Centro historically provided support to fleet squadrons that took advantage of the clear, dry weather and open space found in Imperial Valley. The facility has supported a variety of activities, primarily in the areas of naval parachute testing and training and aeronautical escape system testing, evaluation, and design. In the early 1990s, its mission was redefined, and it became a support and training facility for military aviation units and activities.

NAF El Centro provides services and housing for military personnel and maintains and operates facilities to support aviation activities. The facilities have included a machine and welding shop, photographic laboratory, instrument laboratory, fabric shop, and transportation garage.

Approximately 200 USTs have been used at NAF El Centro to support various activities. Most of these USTs have been removed, and most of the UST sites require no further action or have only soil contamination. Four former UST locations have documented soil and/or groundwater contamination and are the focus of this report (Table 2-1); Table 2-2 provides a summary of construction details for groundwater monitoring wells at these sites. Approximately 86 former UST sites have been closed by the California Regional Water Quality Control Board (RWQCB), and no USTs are currently used to store fuels at NAF El Centro.

2.2 PREVIOUS ENVIRONMENTAL ACTIVITIES

Subsections 2.2.1 through 2.2.4 summarize background information for each site. The following activities have been conducted:

- UST 539 removal and analysis of samples (Amtech 1990)
- UST 533 removal and analysis of samples (ATS 1990)
- UST investigation, Building 116 (Boogay 1990)
- UST site investigation, NEX Gas Station (JEG 1991)
- site assessment, NEX Gas Station (JEG 1992)
- UST removal, NEX Gas Station USTs (ECC 1993)
- UST site assessment at Buildings 116, 533, and 539 (JEG 1993)
- UST removal Phase 2, UST 272 A (Kroeker 1994)
- former UST sites soil removal (UST Site 116) (OHM 1995)

Table 2-1
Underground Storage Tank Summary

UST ID	Alias	Capacity (gallons)	Contents	Construction Materials	Year Installed	Year Removed	Medium Affected	Site Remediation
116		260	Diesel	Steel	1942	1989	Soil and GW	Soil and groundwater removal (OHM 1995)
200 (N)*		250	Waste Oil	Steel	1967	1993	GW	Approximately 1,065 cubic yards of fuel-impacted soil removed from UST Site 200 and disposed off-site (Geofon 2000)
200 (S)(1)*		10,000	Gasoline	Steel	1967	1993	Soil and GW	
200 (S)(2)*		10,000	Gasoline	Steel	1967	1993	Soil and GW	
200 (W)(3)*	200 (E)	10,000	Gasoline	Fiberglass	1974	1993	Soil and GW	
272 A*	200	5,000	Gasoline	Steel	1964	1994	Soil and GW	
272 B*		1,000	Gasoline	Unknown	Unknown	1964	Soil and GW	
272 C*	200 (W)	10,000	Gasoline	Steel	Unknown	1993	Soil and GW	
533		280	Diesel	Steel	1970	1990	Soil and GW	Soil removal (Geofon 2000), purged free product (BNI 2000a)
539		1,000	Diesel	Concrete	1942	1990	Soil and GW	No active remediation

Note:
* part of the former NEX Gas Station USTs

Acronyms/Abbreviations:
GW – groundwater
NEX – Navy Exchange
UST – underground storage tank

Table 2-2
Well Construction Details

Well ID	Construction Date	Casing Diameter (inches)	Total Depth of Boring (feet bgs)	Top of Screen (feet bgs)	Bottom of Screen (feet bgs)
UST Site 116					
116-MW2	10/92	4.0	15.5	5.0	15.0
116-MW3	01/01	2.0	15.0	4.7	14.7
116-MW4	01/01	2.0	15.0	4.7	14.7
116-MW5	01/01	2.0	15.0	4.7	14.7
UST Site 533					
MW533-1	10/92	4.0	15.5	5.0	15.0
533-MW2	01/01	2.0	15.0	4.7	14.7
UST Site 539					
MW539-1	10/92	4.0	15.5	5.0	15.0
539-MW2	01/01	2.0	15.0	4.7	14.7
539-MW3	01/01	2.0	15.0	4.7	14.7
UST Site 200 (NEX Gas Station)					
NEX-MW1	05/90	4.0	15.5	4.0	14.0
NEX-MW2	05/90	4.0	15.0	4.0	14.0
NEX-MW3	05/90	4.0	15.0	4.0	14.0
NEX-MW4	06/92	4.0	15.5	5.0	15.0
NEX-MW5	06/92	4.0	15.2	4.5	14.5
NEX-MW6	06/92	4.0	15.3	4.5	14.5
NEX-MW7	01/99	2.0	14.0	4.0	14.0
NEX-MW8	01/99	2.0	14.0	4.0	14.0

Acronyms/Abbreviations:
bgs – below ground surface
NEX – Navy Exchange
UST – underground storage tank

- UST site investigation (UST Sites 116, 533, 539, and 200 [NEX Gas Station]) (BNI 2000a)
- removal of USTs and remediation of fuel-impacted soil (UST Sites 533 and 200 [NEX Gas Station]) (Geofon 2000)
- annual groundwater monitoring activities at petroleum-only sites (UST Sites 116, 533, 539, and 200 [NEX Gas Station]) (BNI 2001)

2.2.1 UST Site 116

Former UST 116 was a 260-gallon steel tank used to store diesel fuel. It was installed in 1942 near the eastern exterior of Building 116 and removed in 1989. Impacts to soil were identified during the 1989 removal. Chemicals of concern (COCs) were identified in groundwater downgradient from UST 116 (in well 116-MW2) during subsequent investigations (Boogay 1990, JEG 1993, BNI 2000a). The RWQCB issued a notice of violation in 1991.

The site was partially remediated through groundwater extraction and soil excavation, the extent of which was limited by the presence of buildings and utilities (OHM 1995). RWQCB rescinded the notice of violation in 1999.

Three additional groundwater monitoring wells (116-MW3, 116-MW4, and 116-MW5) were installed in January 2001 to further evaluate groundwater conditions at the site (BNI 2001).

2.2.2 UST Site 533

Former UST 533 was a 280-gallon, single-walled, steel tank used to store diesel fuel. It was installed in 1970 east of Building 533, between the building and a water tank. Impacts to soil were identified when UST 533 was removed in 1990 (ATS 1990). Impacts to groundwater were identified when the first monitoring well, MW533-1, was installed at the site (JEG 1993, BNI 2000a). The RWQCB issued a notice of violation in 1991.

The site was partially remediated by soil removal, the extent of which was limited by the presence of buildings and utilities (Geofon 2000). Free product was first measured in and purged from well MW533-1 in 1999 (BNI 2000a). Results from soil and groundwater samples collected downgradient of the site indicated that COC migration was limited (BNI 2000a). The RWQCB rescinded the notice of violation in 1999.

A second groundwater monitoring well, 533-MW2, was installed in January 2001 to further evaluate groundwater conditions at the site, and in February 2001, a free product recovery system was installed in monitoring well MW533-1 (BNI 2001). In October 2002, approximately 0.01 foot of free product was measured in the well, and no free product was measurable in the well during 2003. The free product recovery system was removed from well MW533-1 in November 2003 (BEI 2003b).

2.2.3 UST Site 539

Former UST 539, a 1,000-gallon concrete tank used to store diesel fuel, was installed in 1942 and removed in 1990. Building 539 and UST 539 were previously located south of Building 528. Impacts to soil were identified during removal of UST 539 (Amtech 1990). Monitoring well MW539-1 was installed and was sampled during subsequent investigations, which identified impacts to groundwater (JEG 1993, BNI 2000a). The RWQCB issued a notice of violation in 1991, and rescinded it in 1999.

Two additional groundwater monitoring wells were installed in January 2001 to further evaluate groundwater conditions at the site (BNI 2001).

2.2.4 UST Site 200 (NEX Gas Station)

UST Site 200 (NEX Gas Station) is located on First Street in the southern portion of the facility (Figure 2-1). Seven former USTs (200 [N], 200 [S][1], 200 [S][2], 200 [W][3], 272 A, 272 B, and 272 C) are associated with the NEX Gas Station. USTs 200 (N), 200 (S)(1), 200 (S)(2), and 200 (W)(3) were removed in 1993 and replaced with two aboveground storage tanks. COCs reported in soil samples collected during removal of UST 200 (N) were below cleanup goals (ECC 1993).

Impacts to soil and groundwater were identified during site investigations when eight monitoring wells were installed to delineate the lateral extent of groundwater contamination (JEG 1991, 1992; SOTA 1998; BNI 2000a). The RWQCB issued a notice of violation in 1991. Methyl tert-butyl ether (MTBE) was reported at concentrations exceeding the associated cleanup goal for groundwater; concentrations of other COCs appeared to be declining over time (BNI 2000d). The RWQCB rescinded the notice of violation in 1999.

Former USTs 272 A, 272 B, and 272 C are associated with the previous gas station (Former Building 272), which was located west of the current NEX Gas Station (Building 200). According to historical drawings, UST 272 B was removed in 1964 and replaced with UST 272 A (which was identified as UST 200 in the 1994 Kroeker, Inc., report). Results from soil samples collected during removal of UST 272 A were below cleanup goals (Kroeker 1994). Impacts to soil and groundwater were identified at UST Sites 272 B and 272 C in February 1999 (BNI 2000a), and the area was partially remediated by soil removal (Geofon 2000). Results from confirmation soil samples still exceeded cleanup goals in this area. Monitoring well NEX-MW7 was installed to monitor groundwater downgradient from both the current NEX Gas Station (at Building 200) and the previous gas station (at Building 272).

2.3 PHYSICAL SETTING

NAF El Centro is located on the western side of central Imperial Valley. The topography is relatively flat with surface elevations ranging from approximately 45 to 50 feet below mean sea level. The surrounding area is also relatively flat with the exception of bluffs adjacent to the New River located west of the facility.

2.3.1 Climate

The climate in the vicinity of NAF El Centro is arid with temperatures ranging from approximately 30 degrees Fahrenheit (°F) in the winter to more than 115 °F in the summer. Prevailing winds are westerly in the winter and spring and southeasterly during the summer. Mean annual precipitation is less than 3 inches per year, characterized by isolated thunderstorms with intense rainfall. Annual potential evapotranspiration at NAF El Centro averages approximately 75 inches per year (CIMIS 2004).

2.3.2 Geology

NAF El Centro is located within the Imperial Valley portion of the Colorado Desert geomorphic province (Norris and Webb 1976). Imperial Valley is a seismically active area, which historically has experienced many strong earthquakes. Many of the faults are part of the San Andreas Fault system and nearly all remain active.

The geologic strata underlying Imperial Valley consist of Cenozoic valley-fill deposits over 20,000 feet thick. The surficial deposits in the area of NAF El Centro are lacustrine sediments from Holocene Lake Cahuilla, which are underlain by Pliocene and Pleistocene, heterogeneous, nonmarine, sedimentary rocks. Lacustrine sediments in the vicinity of NAF El Centro consist predominantly of clays, silts, sands, and a combination of sand-silt-clay mixtures. Figure 2-1 presents a generalized geologic cross section illustrating subsurface conditions beneath NAF El Centro (BEI 2004).

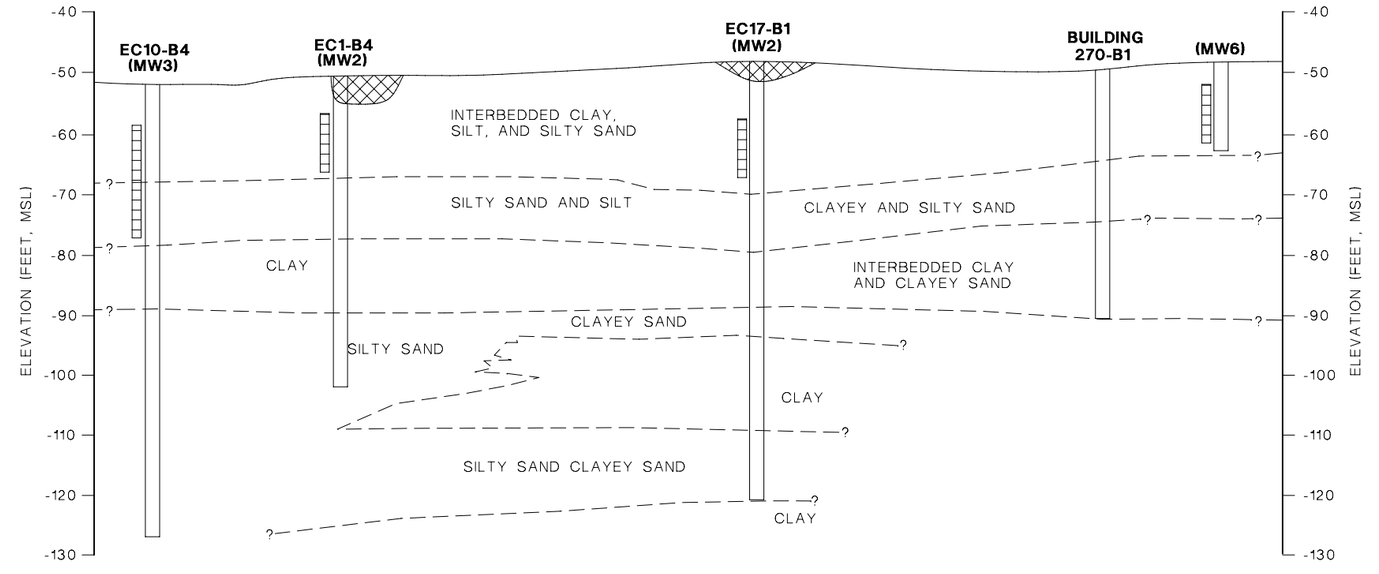
2.3.3 Hydrogeology

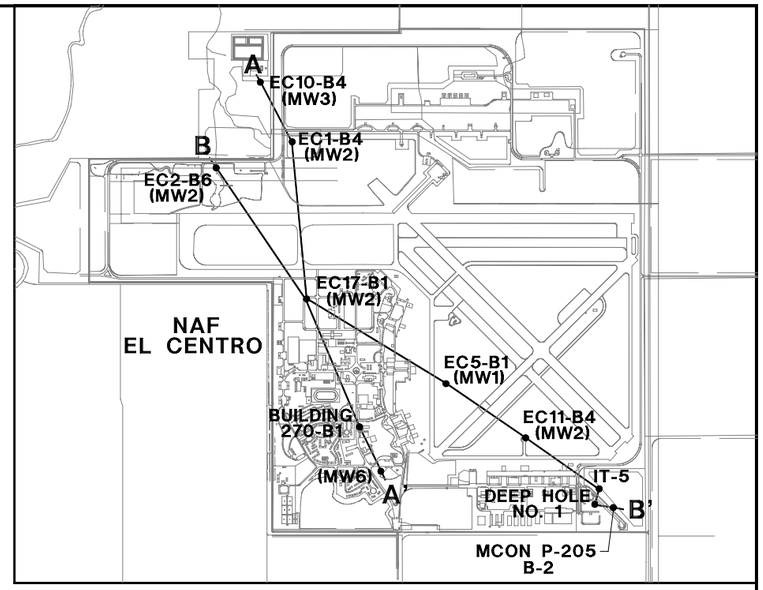
NAF El Centro is located in the Colorado Desert hydrogeologic study area, one of nine areas designated by the California Department of Water Resources. The facility, as well as most of Imperial Valley, is underlain by the Imperial Valley Groundwater Basin, which encompasses approximately 1,870 square miles and drains into the Salton Sea by way of the New and Alamo Rivers. NAF El Centro is located adjacent to (east of) the banks of the New River, which is likely the primary discharge point for groundwater in the vicinity of the facility.

Although the Colorado River Basin RWQCB has designated groundwater in the Imperial hydrologic unit, which includes NAF El Centro, as having municipal and industrial beneficial uses (RWQCB 2002). Although it is recognized that shallow groundwater beneath NAF El Centro is characterized by generally poor quality (e.g., total dissolved solids greater than 10,000 milligrams per liter [mg/L] and elevated sulfate [locally exceeds 9,000 mg/L]) and low aquifer yields, is therefore not designated as a potential source of drinking water (RWQCB 2003).

2.3.3.1 GROUNDWATER MOVEMENT

The water table in central Imperial Valley is generally close to the ground surface because of recharge from intensive agricultural irrigation in the area. The depth to groundwater at the facility typically ranges from approximately 6 feet below ground surface (bgs) at the southeast corner to approximately 40 feet bgs at the northwest corner.





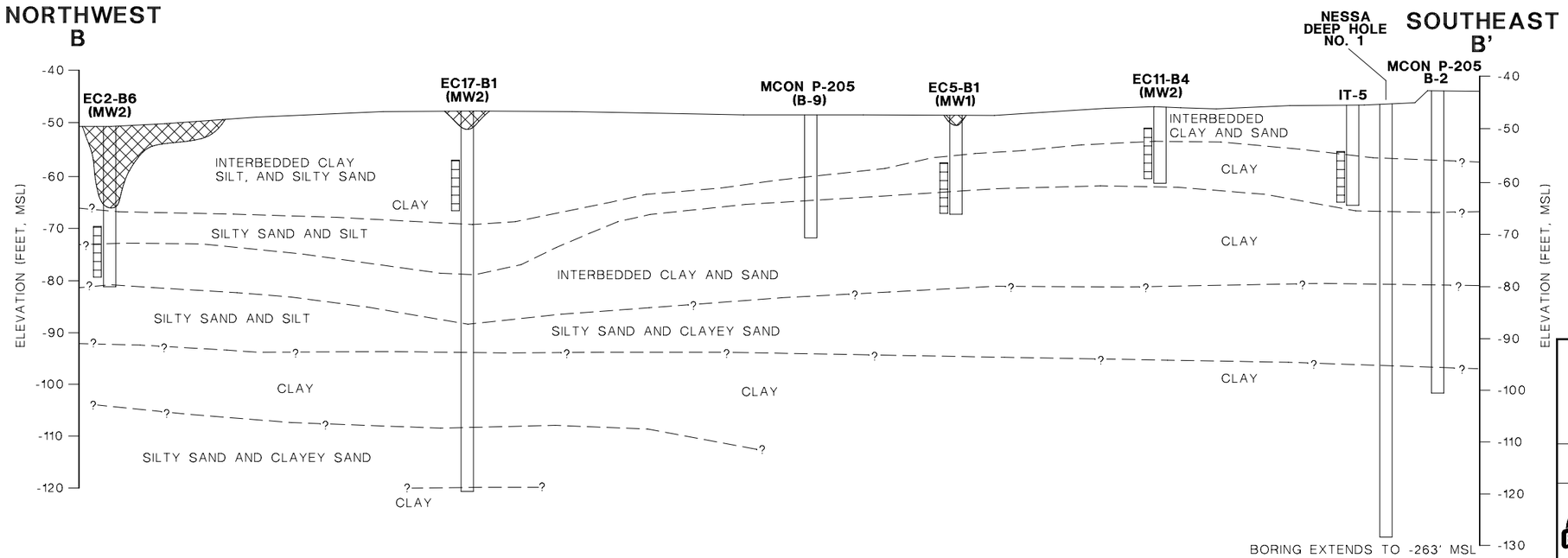
LEGEND

IMPORTED CLEAN FILL

SCREENED INTERVAL

NOTES:

? - QUERY WHERE INFERRED
MSL - MEAN SEA LEVEL
NAF - NAVAL AIR FACILITY



Annual Groundwater Monitoring Report

Figure 2-1

Generalized Lithologic Cross Sections

NAF El Centro, Imperial County, California

Bechtel Environmental, Inc.
CLEAN 3 Program

Date: 7/11/05
File No: 043X13560
Job No: 23818-043
Rev No: B

Reserved for Figure 2-1 (11 × 17) page 2 of 2

Figure 2-2 provides groundwater-level contour maps using January 2004 water-level measurements. Water-level monitoring data are provided in Appendix B. Previous reports provided groundwater-level contour maps using September-October 2002 water-level measurements (BEI 2003a) and April 2003 water-level measurements (BEI 2004). The general groundwater flow direction is from southeast to northwest across the facility. In the southern portion of NAF El Centro, the flow direction is predominantly to the north-northeast. In the northwestern portion of the facility, groundwater flows toward tributary channels leading to the New River, and may be influenced locally by paleotopography and/or irrigation drainage. Some groundwater in the western portion of the facility is interpreted to flow directly toward bluffs of the New River.

Within NAF El Centro, horizontal hydraulic gradients typically range from approximately 0.0001 to 0.001. Maximum horizontal hydraulic gradients (approximately 0.01 to 0.02) are recorded in the northwestern corner of the facility (Figure 2-2), and minimum horizontal hydraulic gradients are recorded in the central area of the facility. The minimum hydraulic gradients are a result of the absence of irrigated land, irrigation canals, and irrigation ditches in this area.

2.3.3.2 CONCEPTUAL HYDROGEOLOGIC MODEL

The generalized stratigraphy at NAF El Centro is represented by interbedded clays, silts, and sands (from the surface to approximately 10 to 15 feet bgs) that are underlain by relatively thick beds of silty sands and silts (Figure 2-1). Interbedded clays are typically 10 to 15 feet thick, and silty sand is typically 5 to 10 feet thick. Below the silty sand is an alternating sequence of clayey units and sandy units that vary from 5 to 15 feet thick.

Recharge of groundwater is expected within and around irrigated areas by the percolation of irrigation water. Groundwater is interpreted to discharge into deep drainage ditches and into the New River and/or its tributaries in the northern portion of the facility.

This page left blank intentionally

EC10-MW7
-87.35
EC10-MW8
-84.61
EC-P7
-87.59
EC6-MW1
DRY
EC10-MW6
DRY
EC1-MW10
-71.11
EC1-MW11
-69.79
EC-P5
-69.28
EC7-MW13
DRY
EC1-MW7
-70.95
EC1-MW12
-68.98
EC1-MW8
-69.36
EC1-MW9
-70.50
EC-P4
-84.72*
EC2-MW9
-71.51
EC2-MW8
-69.49
EC2-MW7
-67.35*
EC2-MW2
-71.86
EC8-MW1
-71.24
EC7-MW14
-71.08
EC2-MW11
-68.77
EC2-MW12
-69.01
EC-P8
-75.10*
EC2-MW1
-69.68
EC7-MW9
-68.91
EC2-MW4
-68.29
EC7-MW10
-66.48
EC2-MW6
-67.55
EC-P2
-68.34*
EC7-MW12
-66.57
EC2-MW10
-67.05
EC7-MW8
-65.06
EC7-MW6
-65.54
EC-P9
-66.10*
EC7-MW2
DRY
EC7-MW1
DRY
EC7-MW7
-61.22
EC-P3
-62.31
EC17-MW2
-60.22
116-MW5
-56.13
116-MW4
-55.74
MW116-2
-55.48
116-MW3
-55.26
NEX-MW8
-53.12
NEX-MW7
NEX-MW4
-52.51
NEX-MW6
-52.76
NEX-MW2
-52.72
NEX-MW1
-52.54
NEX-MW5
-52.63
NEX-MW3
-52.51
539-MW3
-51.96
533-MW2
-52.57
539-MW2
-51.88
MW539-1
-51.89
MW533-1
-52.47
535-MW1
-52.47
NEW RIVER
-70
-68
-66
-64
-62
-60
-58
-56
-54
-86
-84
-82
-80
-78
-76
-74
-72

LEGEND

- 60 — CONTOUR LINE OF EQUAL GROUNDWATER LEVEL ELEVATION VALUE IS IN FEET RELATIVE TO MEAN SEA LEVEL
- WELL/PIEZOMETER
- RUNWAY
- ROAD
- FENCE
- DRAINAGE
- IRRIGATED LAND
- BUILDING
- IRRIGATION CANAL
- WATER
- NAF EL CENTRO BOUNDARY

STATION ID
EC7-MW10
-66.58
ELEVATION IN FEET RELATIVE TO MEAN SEA LEVEL

NOTES:

GROUNDWATER ELEVATIONS MEASURED IN JANUARY 2004

* EC2-MW7 NOT USED IN CONTOURING WATER LEVEL

+ EC-P2, EC-P4, EC-P8, AND EC-P9 NOT USED IN CONTOURING WATER LEVELS. DEEP WELLS

N

600 0 600 Feet

Annual Groundwater Monitoring Report

Figure 2-2

Groundwater Elevations January 2004

NAF El Centro, Imperial County, California

Bechtel Environmental, Inc.
CLEAN 3 Program

Date: 7/18/05
File No.: 043Q13563
Job No.: 23818-043
Rev No.: D

Reserved for Figure 2-2 (Oversized) page 2 of 2

Section 3
DATA QUALITY OBJECTIVES

The seven-step United States Environmental Protection Agency DQO process was used to develop the sampling rationale (U.S. EPA 2000). The data collected will be used to support site closure recommendations. DQOs developed for this work consist of qualitative and quantitative statements describing the required detection limit, degree of certainty, and laboratory quality control (QC) level for each specified use. Section 3 of the Quality Assurance Project Plan (Attachment A to the Work Plan) defines the quantitative DQOs (BNI 2000b). Section 4 of this report provides QC sampling results. Table 3-1 lists qualitative DQOs, which are summarized below.

- *State the problem*. Previous investigations identified petroleum contamination in groundwater in excess of cleanup goals at the petroleum-only sites.
- *Identify the decision*. Are groundwater conditions changing over time (e.g., concentration trends, plume migration, seasonal variations)? Does groundwater contamination extend past the site boundaries?
- *Identify the decision inputs*. Data inputs include historical soil and groundwater sampling results for each site and sampling results from existing monitoring wells. Guidance inputs include cleanup goals.
- *Define the study boundaries*. The lateral extent of the sampling activity encompasses the individual sites and existing wells, if present, and is based on historical sampling results. The vertical extent encompasses the upper water-bearing unit.
- *Develop the decision rules*. If COC concentrations indicate increasing trends, then continued monitoring will be recommended. If COC concentrations indicate stable or decreasing trends, then a recommendation will be made to either reduce the monitoring frequency or discontinue monitoring. If monitoring indicates that chemical concentrations in excess of screening values (Table 3-2) are migrating past site boundaries or are reaching potential receptors, then evaluation of further actions will be recommended.
- *Specify tolerable limits on decision errors*. In sampling designs that use a statistical approach to evaluate the data using decision rules, numerical limits on allowable error can be set and controlled by the sampling design (e.g., the number of samples). In sampling designs that base the conclusions on the judgment of the decision makers, decision errors are reduced by subjective definition of factual basis for the judgment.

  Groundwater monitoring well placement and sampling for this field investigation are based on available knowledge of reported results from previous investigations as well as past activities and practices.

  Measurement errors, which may occur during the various steps of the sample measurement process, are possible regardless of the sampling design. Measurement errors or variability cannot be eliminated but can be controlled by selection of procedures. The Technical Specification for Analytical Laboratory Services TS-002 (BNI 2004) gives the limits on decision errors stemming from field and laboratory measurement errors in the context of quality control acceptance criteria for precision and accuracy.

- *Optimize the sampling design*. Statistical sampling will not be conducted. Therefore, statistical optimization of the design is not applicable. A judgmental sampling approach based on results from previous site investigations will be conducted for these investigations.

Table 3-2 lists cleanup goals for COCs in groundwater based on state of California primary maximum contaminant levels (MCLs) for drinking water. Table 3-3 summarizes the technical approach for each site.

Table 3-1
Data Quality Objectives for UST Sites 116, 533, 539, and 200 (NEX Gas Station)

State the Problem	Identify the Decision	Identify the Decision Inputs	Define the Study Boundaries	Develop the Decision Rules	Specify Tolerable Limits on Decision Errors	Optimize the Sampling Design
Previous investigations identified petroleum contamination in groundwater in excess of cleanup goals at the petroleum-only sites.	Are groundwater conditions changing over time (e.g., concentration trends [increases or decreases], plume migration, seasonal variations)? What is the lateral extent of groundwater contamination?	Data inputs include: • historical soil and groundwater sampling results for each site, and • sampling results from existing wells. Guidance inputs include cleanup goals.	The lateral extent of the sampling activity encompasses the individual sites and existing wells, if present, and is based on historical site sampling results. The vertical extent encompasses the upper water-bearing unit.	If COC concentrations indicate increasing trends, then continued monitoring will be recommended. Additional sampling locations may be recommended at these locations. If COC concentrations indicate stable or decreasing trends, then a recommendation will be made to either reduce the monitoring frequency or discontinue monitoring in an attempt to obtain site closure. If monitoring indicates that chemical concentrations in excess of screening values are migrating past site boundaries or are reaching potential receptors, then evaluation of further actions will be recommended.	There are two types of decision errors: sampling design and measurement. • Sampling design errors are a function of the selection of sampling locations used to characterize the site to be studied. • Measurement errors are a function of the procedures used to collect the data. In sampling designs that use a statistical approach to evaluate the data using decision rules, numerical limits on allowable error can be set and controlled by the sampling design (e.g., the number of samples). In sampling designs that base the conclusions on the judgment of the decision makers, decision errors are reduced by subjective definition of factual basis for the judgment. Groundwater monitoring well placement and sampling for this field investigation are based on available knowledge of reported results from previous investigations as well as past activities and practices. Measurement errors, which occur during the various steps of the sample measurement process (e.g., sample collection, sample handling, sample preparation, sample analysis, data reduction, and data handling), are possible regardless of the sampling design. Measurement errors or variability cannot be eliminated but can be controlled by selection of procedures. The Technical Specification for Analytical Laboratory Services TS-002 (BNI 2004) gives the limits on decision errors stemming from field and laboratory measurement errors in the context of quality control acceptance criteria for precision and accuracy. Additional details are included in the CTO-0208 QAPP (BNI 2000b).	Statistical sampling will not be conducted. Therefore, statistical optimization of the design is not applicable. A judgmental sampling approach based on results from previous site investigations will be conducted for these investigations.

Acronyms/Abbreviations:
COC – chemical of concern
CTO – contract task order
NEX – Navy Exchange
QAPP – quality assurance project plan
UST – underground storage tank

Reserved for Table 3-1 (11 × 17) page 2 of 2

Table 3-2
Summary of Target Detection Limits and Cleanup Goals for Groundwater Analytes
(in micrograms per liter)

Analyte	Laboratory Method	Target Detection Limit	Cleanup Goal
benzene	U.S. EPA 8260B	0.5	1*
toluene	U.S. EPA 8260B	0.5	150*
ethylbenzene	U.S. EPA 8260B	0.5	300*
xylenes	U.S. EPA 8260B	1	1,750*
MTBE	U.S. EPA 8260B	0.5	13*
1,2-dichloroethane	U.S. EPA 8260B	0.5	0.5*
TPH as diesel	U.S. EPA 8015-M	50	NE
TPH as gasoline	U.S. EPA 8015-M	100	NE

Note:
* based on state of California primary maximum contaminant levels for drinking water

Acronyms/Abbreviations:
MTBE – methyl tert-butyl ether
NE – not established
TPH – total petroleum hydrocarbons
U.S. EPA – United States Environmental Protection Agency

Table 3-3
Groundwater Monitoring Design and Chemicals of Concern

Site ID	Associated UST(s)	Monitoring Design	COCs
UST 116	116	Sampled four wells during 2002, 2003, and 2004.	TPH-g, TPH-d, BTEX, MTBE, and 1,2-DCA
UST 533	533	Free product recovery system removed from well MW533-1 in November 2003. Well MW533-1 sampled during 2004. Well 533-MW2 sampled during 2002, 2003, and 2004.	TPH-d, BTEX, and MTBE
UST 539	539	Sampled three wells during 2002, 2003, and 2004.	TPH-d, BTEX, and MTBE
UST Site 200 (NEX Gas Station)	200 (N), 200 (S)(1), 200 (S)(2), 200 (W)(3), 272 A, 272 B, and 272 C	Sampled eight wells during 2002, 2003, and 2004.	TPH-g, BTEX, and MTBE

Acronyms/Abbreviations:
BTEX – benzene, toluene, ethylbenzene, and xylenes
COC – chemical of concern
DCA – dichloroethane
MTBE – methyl tert-butyl ether
NEX – Navy Exchange
TPH-d – total petroleum hydrocarbons as diesel
TPH-g – total petroleum hydrocarbons as gasoline
UST – underground storage tank

Section 4
DATA EVALUATION

This section contains the methodology and procedures applied to the evaluation of analytical data. A third-party subcontractor first validated data submitted by the laboratories. CLEAN 3 personnel then further evaluated the data on the basis of field QC results, including field blanks, trip blanks, and field duplicates. Once this process was completed, the data were used to make decisions and recommendations for individual sites as discussed in Section 5.

4.1 DATA VALIDATION

Laboratory analytical results were subjected to 10 percent Level IV (formerly Naval Energy and Environmental Support Activity [NEESA] Level D) and 90 percent Level III (formerly NEESA Level C) data validation. Level III validation included a detailed review of holding times, calibration results, QC measurements (including blanks, matrix spikes, duplicates, and laboratory control standards), and data completeness. Level IV validation includes all Level III reviews plus verification of calculations from raw data. Procedures for data validation reports are provided in Appendix E. The data validation reports frequently use the phrase, "No Sample Data Qualified in this SDG [sample delivery group]." This phrase indicates that the data were validated and that no qualifiers were necessary because all acceptance criteria were met.

Qualifiers were assigned to the data on the basis of review findings. The following qualifiers were applied, as appropriate.

- U – The analyte was not reported above the detection limit. The associated numerical value is the detection limit.
- J – The associated numerical value is an estimated quantity.
- UJ – The analyte was not reported above the detection limit. The sample quantitation limit is an estimated quantity.
- N – There is presumptive evidence the analyte is present.
- NJ – There is presumptive evidence the analyte is present at an estimated quantity.
- R – The result is unusable.

Validation qualifiers are included with analytical results presented in tables in this report. Tables of analytical results presented in Section 5 contain results from both current and previous sampling rounds. Because not all data from the previous sampling rounds were subjected to full data validation, data qualifiers assigned by laboratories are presented with data obtained during previous rounds.

Data were generally found to be acceptable with respect to accuracy, precision, completeness, and comparability criteria. All COC results were found to be of usable quality.

4.2 FIELD QUALITY CONTROL SAMPLE EVALUATION

Contamination of groundwater samples can occur from external sources during sample collection, shipment, storage, preparation, or analysis. Blanks can be used to evaluate external contamination sources if they are handled in the same manner as the samples. During field activities, equipment rinsate blank samples were obtained by pouring clean water over or through decontaminated sampling equipment. The samples were then analyzed by the laboratory to evaluate the presence of any contaminants that may have been introduced during sample collection. Trip blank samples were analyzed to evaluate contaminants introduced during sample shipment and handling. Source blank samples were collected from each source of water used for equipment decontamination. In the laboratory, calibration blanks were analyzed to detect fluctuations or drifts in instrument baseline response. Method blank samples were analyzed to detect contamination from laboratory sources such as reagents, glassware, and airborne contaminants.

4.2.1 Laboratory Blanks

Laboratory blank results were evaluated during data validation to assess the effect of possible laboratory contamination on sample results. When target analytes were reported in blanks, the associated sample results were compared to the blank result. If the analyte was reported in the sample at a concentration less than five times the blank concentration (or ten times the blank concentration for the common laboratory contaminants acetone, 2-butanone, methylene chloride, toluene, and phthalate esters), the sample result was qualified as not detected.

4.2.2 Field Blanks

Field blank data were reviewed during data validation. Sample results from 2002, 2003, and 2004 were not qualified based on field blank results. MTBE was reported in a source water blank collected on 07 October 2002. When target analytes were reported in blanks, the associated sample results were compared to the blank result. If the analyte was reported in the sample at a concentration less than five times the blank concentration (or ten times the blank concentration for the common laboratory contaminants acetone, 2-butanone, methylene chloride, toluene, and phthalate esters), the sample result was qualified as not detected.

Results of the field blanks collected during the 2002, 2003, and 2004 sampling events are presented in Tables 4-1, 4-2, and 4-3, respectively. Tap water used for decontamination was obtained from potable water sources at the facility. Purified water was used in the final rinse and to collect the rinsate blanks.

4.2.3 Trip Blanks

Sample results from 2002, 2003, and 2004 were not qualified based on trip blank results. Toluene was reported in a trip blank submitted to the laboratory on 08 October 2002. Results of the trip blanks collected during the 2002, 2003, and 2004 sampling events are presented in Tables 4-1, 4-2, and 4-3, respectively.

Table 4-1
Field Quality Control Data
Sampling Event C043001

Analyte	Units	SAMPLE TYPE/SAMPLE ID/SAMPLING DATE													
		SWQC C043B001 10/07/02	ER C043R001 10/02/02	ER C043R002 10/03/02	ER C043R003 10/04/02	ER C043R004 10/07/02	ER C043R007 10/08/02	ER C043R008 10/09/02	ER C043R009 10/10/02	TB C043T001 10/02/02	TB C043T002 10/03/02	TB C043T003 10/04/02	TB C043T004 10/07/02	TB C043T005 10/08/02	TB C043T006 10/09/02
Volatile Organic Compounds															
benzene	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
ethylbenzene	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
toluene	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
xylenes (total)	µg/L	1U	1 U	1 U	1U	1U	1U	1U	1U	1 U	1 U	1 U	1 U	1 U	1 U
methyl tert-butyl ether	µg/L	0.41 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Fuels															
gasoline	µg/L	100 U	100 UJ	100 U	100 U	100 U	100 U	NA	NA	NA	100 U	100 U	NA	NA	NA
diesel	µg/L	50 U	50 U	50 U	50 U	50 U	NA	NA	NA	NA	NA	NA	NA	NA	NA

Analyte	Units	SAMPLE TYPE/SAMPLE ID/SAMPLING DATE												
		TB C043T007 10/10/02	TB C043T009 10/14/02	TB C043T010 10/02/02	TB C043T013 10/07/02	TB C043T014 10/08/02	TB C043T015 10/10/02	TB C043T017 10/14/02	TB C043T018 10/15/02	TB C043T019 10/15/02	TB C043T020 10/16/02	TB C043T021 10/16/02	TB C043T022 10/17/02	TB C043T023 10/17/02
Volatile Organic Compounds														
benzene	µg/L	1 U	1 U	NA	NA	NA	NA	NA	1 U	NA	1 U	NA	1 U	NA
ethylbenzene	µg/L	1 U	1 U	NA	NA	NA	NA	NA	1 U	NA	1 U	NA	1 U	NA
toluene	µg/L	1 U	1 U	NA	NA	NA	NA	NA	0.43 J	NA	1 U	NA	0.47 J	NA
xylenes (total)	µg/L	1U	1 U	NA	NA	NA	NA	NA	1U	NA	1 U	NA	1 U	NA
methyl tert-butyl ether	µg/L	1 U	1 U	NA	NA	NA	NA	NA	1 U	NA	1 U	NA	1 U	NA
Fuels														
gasoline	µg/L	NA	NA	100 UJ	100 U	100 U	100 UJ	100 U	NA	100 UJ	NA	100 UJ	NA	100 U
diesel	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Acronyms/Abbreviations:
ER – equipment rinsate
µg/L – micrograms per liter
NA – not analyzed
SWQC – source water quality control
TB – trip blank

Review Qualifiers:
J – numerical value is an estimated quantity
U – not reported above the detection limit
UJ – analyte not reported above the detection limit; sample quantitation limit is an estimated quantity

Reserved for Table 4-1 (11 × 17) page 2 of 2

Table 4-2
Field Quality Control Data
Sampling Event C043002UST

Analyte	Units	SAMPLE TYPE/SAMPLE ID/SAMPLING DATE									
		ER C043R011 4/25/03	ER C043R017 4/23/03	ER C043R018 4/24/03	ER C043R019 4/28/03	ER C043R020 4/29/03	ER C043T024 4/23/03	ER C043T025 4/24/03	ER C043T026 4/25/03	TB C043T027 4/28/03	TB C043T028 4/29/03
Volatile Organic Compounds											
benzene	µg/L	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 UJ
ethylbenzene	µg/L	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 UJ
toluene	µg/L	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 UJ
xylenes (total)	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
methyl tert-butyl ether	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
Fuels											
gasoline	µg/L	100 U	100 U	100 U	100 UJ	100 U	NA	100 U	100 U	100 UJ	100 U
diesel	µg/L	50 U	NA	50 U	NA	NA	NA	NA	NA	NA	NA

Acronyms/Abbreviations:
ER – equipment rinsate
µg/L – micrograms per liter
NA – not analyzed
TB – trip blank

Review Qualifiers:
U – not reported above the detection limit
UJ – analyte not reported above the detection limit; sample quantitation limit is an estimated quantity

Table 4-3
Field Quality Control Data
Sampling Event C043004UST

Analyte	Units	SAMPLE TYPE/SAMPLE ID/SAMPLING DATE ER C043R025 1/13/04	ER C043R026 1/14/04	ER C043R027 1/15/04	ER C043R028 1/16/04	ER C043R029 1/21/04	ER C043R030 1/22/04	ER C043T040 1/13/04	ER C043T041 1/14/04	TB C043T042 1/15/04	TB C043T043 1/16/04	TB C043T045 1/21/04
Volatile Organic Compounds												
benzene	µg/L	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
ethylbenzene	µg/L	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
toluene	µg/L	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
xylenes (total)	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
methyl tert-butyl ether	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Fuels												
gasoline	µg/L	100 U	100 U	NA	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
diesel	µg/L	50 U	50 U	50 U	NA	NA	NA	NA	NA	NA	NA	NA

Acronyms/Abbreviations:
ER – equipment rinsate
µg/L – micrograms per liter
NA – Not analyzed
TB – trip blank

Review Qualifier:
U – not reported above the detection limit

4.2.4 Field Duplicates

Field duplicates were collected during the 2002, 2003, and 2004 sampling events. Field duplicate results are presented in Section 5 tables. Concentrations of reported analytes are generally consistent between the original samples and their associated duplicates. These results indicate that the laboratory techniques were reproducible.

This page left blank intentionally

Section 5
RESULTS, CONCLUSIONS, AND RECOMMENDATIONS

This section summarizes analytical results from the sampling events conducted in 2002, 2003, and 2004. Where applicable, recommendations for site closure or for further action are included on the basis of current and historical analytical results and field observations, site information, and DQOs developed for this investigation.

COCs for petroleum-only sites include benzene, toluene, ethylbenzene, xylenes, total petroleum hydrocarbons (TPH) as gasoline, TPH as diesel, MTBE, and 1,2-dichloroethane (DCA). The tables in this section present analytical results for COCs, whereas the figures present results for all analytes reported above their respective detection limits. Water quality hydrographs (plots of concentration versus time) were prepared for visual trend analyses of frequently reported COCs, and are also included as figures in this section.

All Section 5 tables and figures are presented together at the end of this section in the order they are referenced in text.

5.1 UST SITE 116

Monitoring results obtained during 2002, 2003, and 2004, indicate that benzene and 1,2-DCA were the only COCs reported in groundwater at concentrations exceeding respective cleanup goals. Other COCs reported in groundwater at UST Site 116 include TPH as gasoline and as diesel, and ethylbenzene (Figure 5-1, Table 5-1).

Concentrations of benzene, TPH as gasoline and as diesel, and ethylbenzene have decreased markedly since 1999. Maximum concentrations of all COCs were reported in one well (116-MW2), which is located approximately 40 feet downgradient of former UST 116. Water quality hydrographs indicate that concentrations of COCs in groundwater have decreased markedly since groundwater monitoring was initiated in 1992 (Figure 5-2). Specifically, reported concentrations of benzene in well 116-MW2 have decreased approximately three orders of magnitude from a maximum of 3,200 micrograms per liter (μg/L) in 1999 to 3.2 μg/L in April 2003 and 3.5 μg/L in January 2004. The California MCL for benzene is 1 μg/L. Concentrations of TPH as diesel decreased from a maximum of 88.3 mg/L in 1992 to 2.2 mg/L in 2004. Concentrations of TPH as gasoline decreased from a maximum of 11 mg/L in 1999 to 1.4 mg/L in January 2004. Cleanup goals for TPH as gasoline or as diesel have not been established. 1,2-DCA, a lead scavenger used in gasoline, was reported in two of five samples at concentrations of 11 and 10 μg/L in April 2003 and January 2004, respectively. The California MCL for 1,2-DCA is 0.5 μg/L.

No COCs have been reported in any groundwater samples from downgradient monitoring well 116-MW5 since 1991; well 116-MW5 is located approximately 260 feet downgradient from former UST 116. In addition, no COCs have been reported in groundwater samples from downgradient well 116-MW4 at concentrations exceeding cleanup goals since June 2001; well 116-MW4 is located approximately 140 feet downgradient from former UST 116.

Monitoring results indicate there has been little downgradient migration of COCs from the source area (at former UST 116) since monitoring was initiated in 1992, and concentrations

of COCs display marked decreasing (benzene and ethylbenzene) or stable (1,2-DCA) concentration trends. Decreasing concentration trends are anticipated to continue in the vicinity of source area well 116-MW2 as a result of natural attenuation processes. On the basis of these monitoring results , it is recommended that further groundwater monitoring be discontinued at UST Site 116, and that the four monitoring wells at the site be destroyed in accordance with applicable procedures and regulations. It is further recommended that the UST case be closed by the RWQCB and documented by completion of the Tank Closure Form presented in Appendix F.

5.2 UST SITE 533

Monitoring results obtained from two wells at UST Site 533 during 2002, 2003, and 2004, indicate that no COCs were reported in groundwater at concentrations exceeding respective cleanup goals (Table 5-2, Figure 5-3). Groundwater samples were not collected from well MW533-1 during 2002 and 2003 due to the presence of floating free product in the well. Well MW533-1 is located less than approximately 5 feet from former UST 533. A free product recovery system operated in the well between February 2001 and November 2003, when it was discontinued because free product was no longer present. When well MW533-1 was sampled during January 2004, TPH as diesel, benzene, ethylbenzene, total xylenes, and MTBE were reported above detection limits but below cleanup goals. Monitoring results obtained from 2002 to 2004 indicate that the only COC reported in downgradient well 533-MW2 was MTBE, which was reported at estimated concentrations ranging from 0.22 J to 0.35 J μg/L (Table 5-2, Figure 5-3). Monitoring well 533-MW2 is located approximately 45 feet downgradient from the location of former UST 533.

On the basis of monitoring results obtained from 2002 to 2004, which indicate that COCs in groundwater are below cleanup goals, it is recommended that groundwater monitoring at UST Site 533 be discontinued and the two monitoring wells at the site be destroyed in accordance with applicable procedures and regulations. It is further recommended that the UST case be closed by the RWQCB and documented by completion of the Tank Closure Form presented in Appendix F.

5.3 UST SITE 539

Monitoring results obtained from the wells at UST Site 539 from 1992 to 2004 indicate that benzene was the only COC reported at concentrations exceeding respective cleanup goals (Table 5-3, Figure 5-4). Benzene was reported in only one of three wells at the site (source area well 539-MW1) at concentrations ranging from 6 to 12 μg/L (the cleanup goal for benzene is 1 μg/L). Maximum concentrations of other COCs including TPH as diesel and as gasoline, toluene, ethylbenzene, and total xylenes were also reported in this well but at concentrations that did not exceed respective cleanup goals (for toluene, ethylbenzene, and total xylenes). Monitoring well 539-MW1 is located within approximately 5 feet of the location of former UST 539.

Water quality hydrographs indicate that concentrations of benzene reported in well 539-MW1 have decreased from a maximum of 35.5 μg/L in October 1992 to 9.8 μg/L in

January 2004 (Figure 5-5). Reported concentrations of TPH as diesel decreased from a maximum of 1,730 mg/L in October 1992 to 22 mg/L in January 2004. TPH as diesel was reported at concentrations of 1.3 to 1.6 mg/L in downgradient wells 539-MW2 and 539-MW3, respectively, during January 2004. Wells 539-MW2 and 539-MW3 are located approximately 60 and 140 feet downgradient from former UST 539, respectively.

Monitoring results indicate that there has been little downgradient migration of COCs from the source location at former UST 539, and concentrations of COCs are markedly decreasing or are stable since monitoring was initiated in 1992. Decreasing concentration trends are anticipated to continue in the vicinity of well 539-MW1 as a result of natural attenuation processes. On the basis of these monitoring results, it is recommended that further groundwater monitoring at Site UST 539 be discontinued and the three monitoring wells at the site be destroyed in accordance with applicable regulations. It is further recommended that the UST case be closed by the RWQCB and documented by completion of the Tank Closure Form presented in Appendix F.

5.4 UST SITE 200 (NEX GAS STATION)

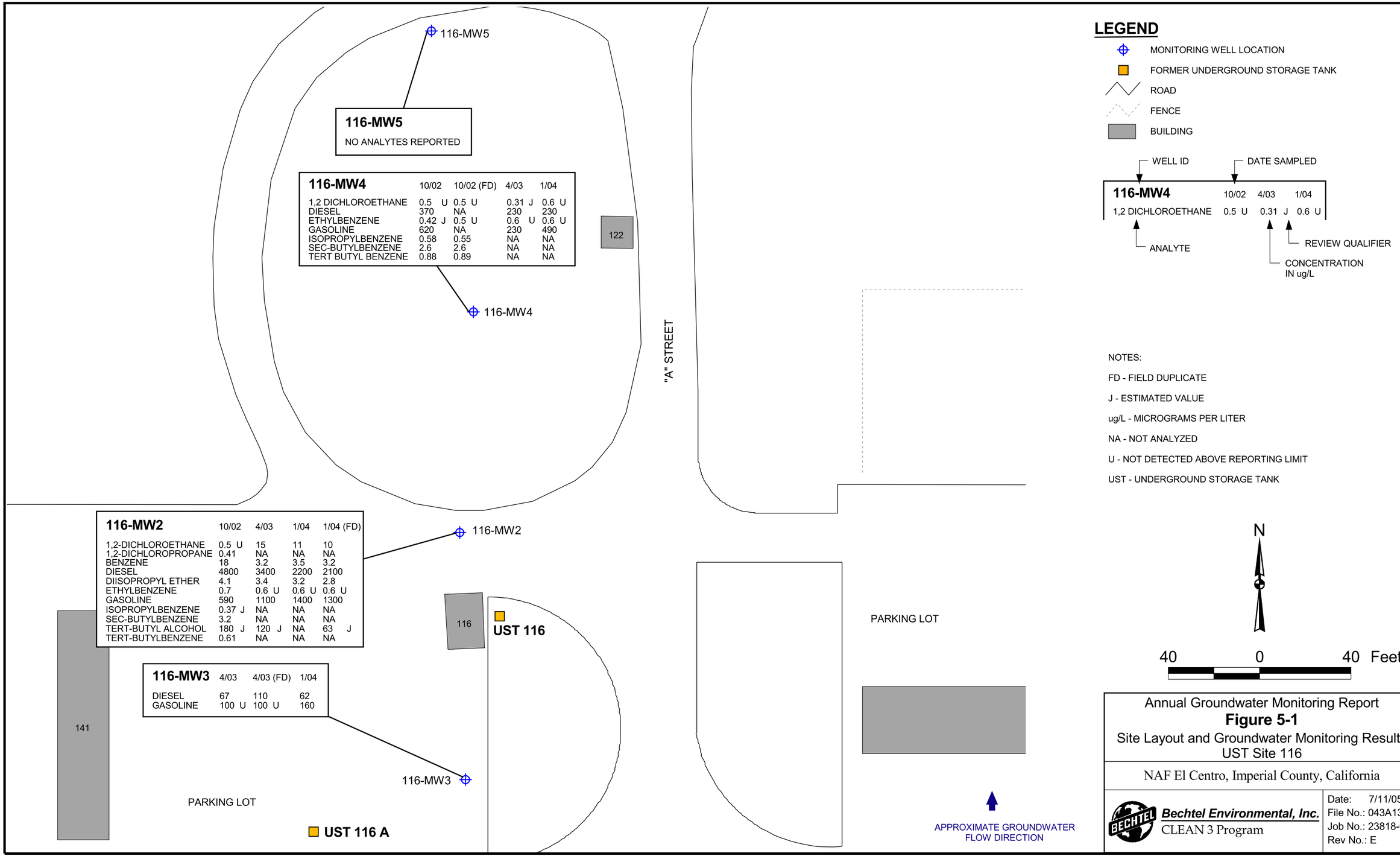
No COCs were reported in any of the eight monitoring wells at UST Site 200 (NEX Gas Station) at concentrations exceeding respective cleanup goals during January 2004. MTBE was the only COC reported in groundwater at the site during January 2004; however, it was not reported at concentrations exceeding its cleanup goal (13 μg/L) (Figure 5-6, Table 5-4). MTBE was reported at a concentration of 5.7 μg/L in the source area well NEX-MW6 and at an estimated concentration of 0.48 μg/L in well NEX-MW2.

MTBE and benzene have historically been reported in well NEX-MW6 at concentrations exceeding respective cleanup goals (13 and 1 μg/L, respectively); well NEX-MW6 is located within approximately 15 feet of former UST 200(N). A water quality hydrograph for this well indicates that concentrations of MTBE have decreased more than one order of magnitude, from 130 μg/L in September 1997 to 5.7 μg/L in January 2004 (Figure 5-7). With one exception, benzene was not reported in any well at the site since January 2001 (benzene was reported at a concentration of 0.48 μg/L in well NEX-MW2 during the April 2003 sampling event) (Table 5-4).

COCs have not been historically reported in wells NEX-MW4, NEX-MW7, or NEX-MW8 since monitoring was initiated in these wells, except during one monitoring event in January 2001 when benzene was reported in all wells sampled at concentrations ranging from 2 to 4 μg/L (Table 5-4). Similarly, COCs have not been reported in wells NEX-MW1 or NEX-MW5 since June–July 1992.

Monitoring results indicate that with the exception of MTBE, COCs have not been reported at concentrations exceeding cleanup goals since June 2001 (Table 5-4). Since that time, concentrations of MTBE reported in well NEX-MW6 have decreased from 54 to 5.7 μg/L, which is below the MCL for MTBE. Concentrations of MTBE are expected to continue to decrease as a result of natural attenuation processes. On the basis of monitoring results which indicate that COCs in groundwater are below cleanup goals, it is recommended that further groundwater monitoring at the site be discontinued, and

the eight monitoring wells at the site be destroyed in accordance with applicable regulations and procedures. It is further recommended that the UST case be closed by the RWQCB and documented by completion of the Tank Closure Form presented in Appendix F.



Annual Groundwater Monitoring Report

Figure 5-1

Site Layout and Groundwater Monitoring Results
UST Site 116

NAF El Centro, Imperial County, California

Bechtel Environmental, Inc.
CLEAN 3 Program

Date: 7/11/05
File No.: 043A13564
Job No.: 23818-043
Rev No.: E

Reserved for Figure 5-1 (11 × 17) page 2 of 2

Table 5-1
Analytical Results for UST Site 116
(reported in micrograms per liter)

Sample ID	Well ID	TPH as Gasoline	TPH as Diesel	Benzene	Toluene	Ethyl-benzene	Total Xylenes	m,p-Xylenes	o-Xylene	MTBE	1-2, DCA
Groundwater Cleanup Goals		**NE**	**NE**	**1.0**	**150**	**300**	**1,750**	**1,750[a]**	**1,750[a]**	**13**	**0.5**
Historical Groundwater Results – JEG UST Site Assessment, October 1992 (JEG 1993)											
MW116-2	116-MW2	NA	88,300	**14.2**[b]	1.9	3.4	474	NA	NA	NA	NA
Historical Groundwater Results – BNI Field Investigation, January 1999 (BNI 2000c)											
175GW10	116-MW2	11,000	8,100	**3,200**	20 U	410	20 U	NA	NA	200 U	NA
Historical Groundwater Results – BNI Field Investigation, January 2001 (BNI 2001)											
208G133	116-MW2	3,000 J	37,000 J	**880 J**	50 U	150	100 U	50 U	50 U	50 U	50 U
208G134	116-MW3	260	530 UJ	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U
208G137 (FD)	116-MW3	250	540	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U
208G135	116-MW4	470	1,400	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U
208G136	116-MW5	100 U	530 U	1 UJ	1 U	1 U	NA	1 U	1 U	1 U	1 U
Historical Groundwater Results – BNI Field Investigation, June 2001 (BNI 2001)											
208G233	116-MW2	2,800	32,000	**500**	1 U	100	1 U	1 U	1 U	1 U	1 U
208G234	116-MW3	100 U	520 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
208FD34 (FD)	116-MW3	100 U	540 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
208G235	116-MW4	630	980	**2**	0.5 J	0.7 J	1 U	1 U	1 U	0.7 J	1 U
208G236	116 MW5	100 U	500 U	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U
Groundwater Results – BEI Field Investigation, October 2002											
C043G024	116-MW2	590	4,800	**18**	0.5 U	0.7	NA	0.5 U	0.5 U	0.5 U	0.5 U
C043G025	116-MW3	100 U	50 U	0.4 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U
C043G026	116-MW4	620	370	0.4 U	0.5 U	0.42 J	NA	0.5 U	0.5 U	0.5 U	0.5 U

(table continues)

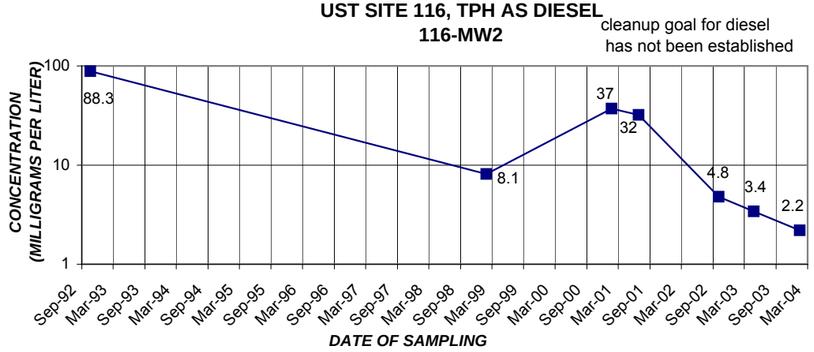
Table 5-1 (continued)

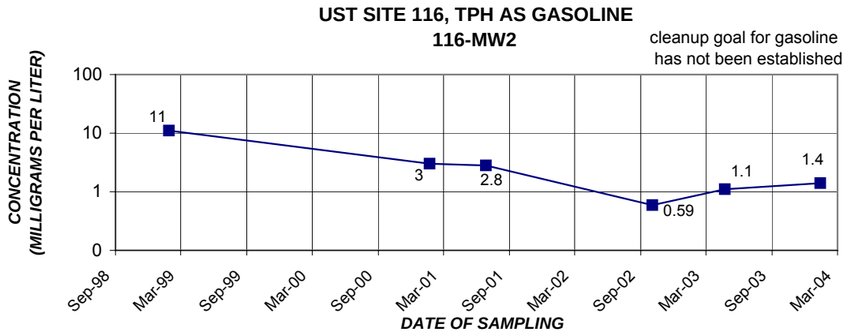
Sample ID	Well ID	TPH as Gasoline	TPH as Diesel	Benzene	Toluene	Ethyl-benzene	Total Xylenes	m,p-Xylenes	o-Xylene	MTBE	1-2, DCA
Groundwater Cleanup Goals		**NE**	**NE**	**1.0**	**150**	**300**	**1,750**	**1,750[a]**	**1,750[a]**	**13**	**0.5**
Groundwater Results – BEI Field Investigation, October 2002 (continued)											
C043G043 (FD)	116-MW4	NA	NA	0.4 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U
C043G027	116-MW5	100 U	50 U	0.4 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U
Groundwater Results – BEI Field Investigation, April 2003											
C043G102	116-MW2	1,100	3,400	**3.2**	1.1 U	0.6 U	0.5 U	NA	NA	0.5 U	**15**
C043G100	116-MW3	100 U	67	0.4 U	1.1 U	0.6 U	0.5 U	NA	NA	0.5 U	0.5 U
C043G101 (FD)	116-MW3	100 U	110	0.4 U	1.1 U	0.6 U	0.5 U	NA	NA	0.5 U	0.5 U
C043G103	116-MW4	230	230	0.4 U	1.1 U	0.6 U	0.5 U	NA	NA	0.5 U	0.31 J
C043G104	116-MW5	100 U	50 U	0.4 U	1.1 U	0.6 U	0.5 U	NA	NA	0.5 U	0.5 U
Groundwater Results – BEI Field Investigation, January 2004											
C043G125	116-MW2	1,400	2,200	**3.5**	1.1 U	0.6 U	0.5 U	NA	NA	0.5 U	**11**
C043G126 (FD)	116-MW2	1,300	2,100	**3.2**	1.1 U	0.6 U	0.5 U	NA	NA	0.5 U	**10**
C043G127	116-MW3	160	62	0.4 U	1.1 U	0.6 U	0.5 U	NA	NA	0.5 U	0.5 U
C043G128	116-MW4	490	230	0.4 U	1.1 U	0.6 U	0.5 U	NA	NA	0.5 U	0.5 U
C043G129	116-MW5	100 U	50 U	0.4 U	1.1 U	0.6 U	0.5 U	NA	NA	0.5 U	0.5 U

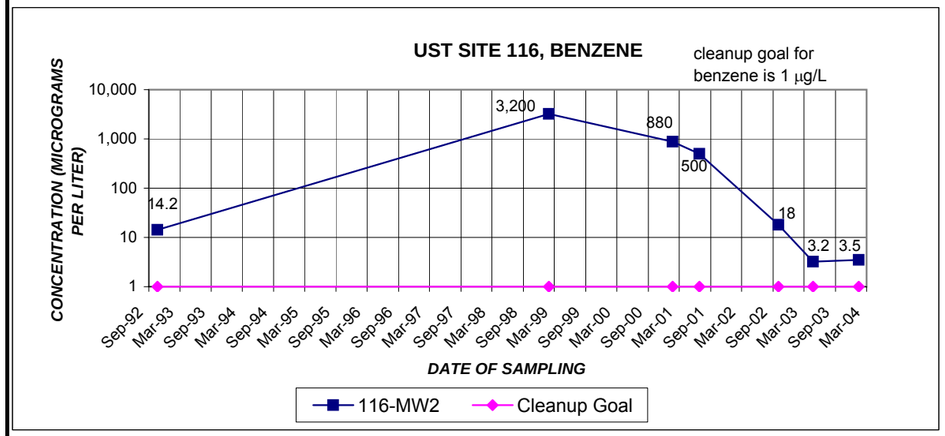
Notes:
[a] groundwater cleanup goal is for total xylenes
[b] bold indicates a result that is above the associated cleanup goal

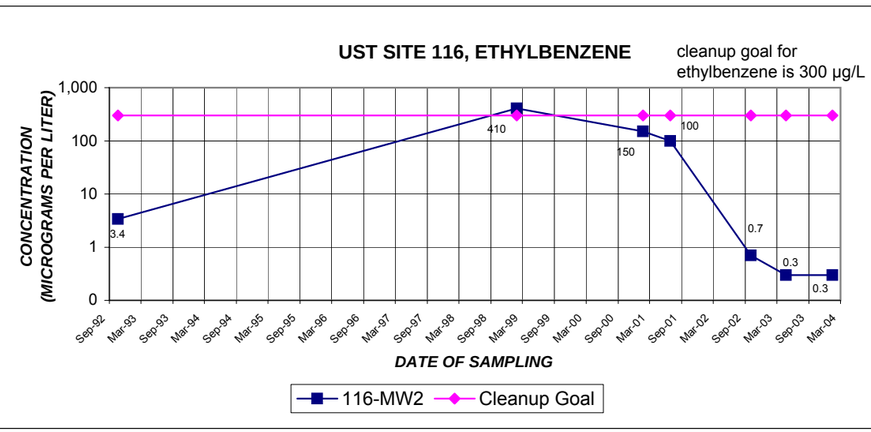
Acronyms/Abbreviations:
BEI – Bechtel Environmental, Inc.
BNI – Bechtel National, Inc.
DCA – dichloroethane
FD – field duplicate
JEG – Jacobs Engineering Group Inc.
MTBE – methyl tert-butyl ether
NA – not analyzed
NE – not established
TPH – total petroleum hydrocarbons
UST – underground storage tank

Review Qualifiers:
J – numerical value is an estimated quantity
U – not reported above the detection limit
UJ – analyte not reported above the detection limit; sample quantitation limit is an estimated quantity









Notes:
1/2 the detection limit shown for nondetect results.
Highest concentration graphed for duplicate results.
µg/L – micrograms per liter

Annual Groundwater Monitoring Report

Figure 5-2

Petroleum Hydrocarbons and VOC Concentrations Over Time – UST Site 116

NAF El Centro, Imperial County, California

Bechtel Environmental, Inc.
CLEAN 3 Program

Date: 6/29/05
File No.: See Footer
Job No.: 23818-043
Rev. No.: B

Reserved for Figure 5-2 (11 x 17) page 2 of 2

Table 5-2
Analytical Results for UST Site 533
(reported in micrograms per liter)

Sample ID	Well ID	TPH as Gasoline	TPH as Diesel	Benzene	Toluene	Ethylbenzene	Total Xylenes	m,p-Xylenes	o-Xylene	MTBE
Groundwater Cleanup Goals		**NE**	**NE**	**1.0**	**150**	**300**	**1,750**	**1,750**[a]	**1,750**[a]	**13**
Historical Groundwater Results – JEG UST Site Assessment, October 1992 (JEG 1993)										
MW533-1A	MW533-1	NA	7,100	**2**[b]	0.3 U	3.8	1.1	NA	NA	NA
MW533-1B	MW533-1	NA	47,600	**1.2**	0.3 U	3.1	1.1	NA	NA	NA
Historical Groundwater Results – BNI Field Investigation, January 1999 (BNI 2000c)										
175GW09	MW533-1	NA	NA	12 U	25 U	25 U	29	NA	NA	250 U
Historical Groundwater Results – BNI Field Investigation, January 2001 (BNI 2001)										
208G138	533-MW2	100 U	530 U	1 U	1 U	1 U	NA	1 U	1 U	1 U
Historical Groundwater Results – BNI Field Investigation, June 2001 (BNI 2001)										
208G238	533-MW2	100 U	530 U	1 U	1 U	1 U	NA	1 U	1 U	1 U
Groundwater Results – BEI Field Investigation, October 2002										
C043G028	533-MW2	100 UJ	50 U	0.4 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.32 J
Groundwater Results – BEI Field Investigation, April 2003										
C043G105	533-MW2	NA	50 U	0.4 U	1.1 U	0.6 U	0.5 U	NA	NA	0.35 J
Groundwater Results – BEI Field Investigation, January 2004										
C043G130	MW533-1	NA	18,000	0.54	1.1 U	7.5	2	NA	NA	0.38 J
C043G131	533-MW2	NA	50 U	0.4 U	1.1 U	0.6 U	0.5 U	NA	NA	0.22 J

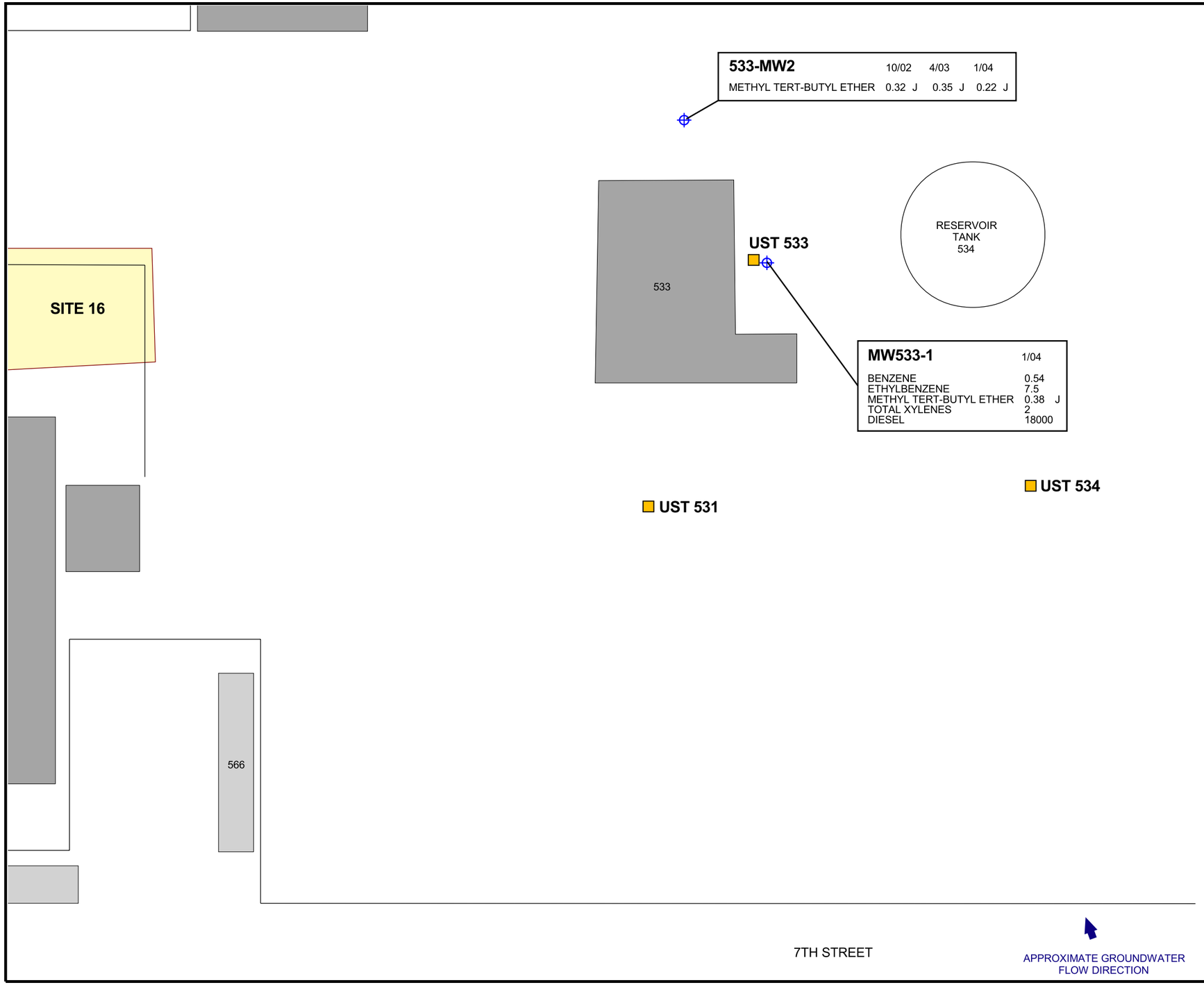
Notes:
[a] groundwater cleanup goal is for total xylenes
[b] bold value indicates a result that is above the associated cleanup goal

(table continues)

Table 5-2 (continued)

Acronyms/Abbreviations:
- BEI – Bechtel Environmental, Inc.
- BNI – Bechtel National, Inc.
- JEG – Jacobs Engineering Group Inc.
- MTBE – methyl tert-butyl ether
- NA – not analyzed
- NE – not established
- TPH – total petroleum hydrocarbons
- UST – underground storage tank

Review Qualifiers:
- J – numerical value is an estimated quantity
- U – not reported above the detection limit
- UJ – analyte not reported above the detection limit; sample quantitation limit is an estimated quantity



LEGEND

- MONITORING WELL LOCATION
- FORMER UNDERGROUND STORAGE TANK
- ROAD
- TANK
- BUILDING
- SHED
- IR SITE

STATION ID — DATE SAMPLED

533-MW2 10/02 4/03 1/04

METHYL TERT-BUTYL ETHER 0.32 J 0.35 J 0.22 J

ANALYTE — CONCENTRATION IN ug/L — REVIEW QUALIFIER

NOTES:

J - ESTIMATED VALUE

ug/L - MICROGRAMS PER LITER

UST - UNDERGROUND STORAGE TANK

N

30 0 30 Feet

Annual Groundwater Monitoring Report

Figure 5-3

Site Layout and Groundwater Monitoring Results
UST Site 533

NAF El Centro, Imperial County, California

Bechtel Environmental, Inc.
CLEAN 3 Program

Date: 7/11/05
File No.: 043A13565
Job No.: 23818-043
Rev No.: D

Reserved for Figure 5-3 (11 x 17) page 2 of 2

Table 5-3
Analytical Results for UST Site 539
(reported in micrograms per liter)

Sample ID	Well ID	TPH as Gasoline	TPH as Diesel	Benzene	Toluene	Ethylbenzene	Total Xylenes	m,p-Xylenes	o-Xylene	MTBE
Groundwater Cleanup Goals		**NE**	**NE**	**1.0**	**150**	**300**	**1,750**	**1,750[a]**	**1,750[a]**	**13**
Historical Groundwater Results – JEG UST Site Assessment, October 1992 (JEG 1993)										
MW539-1A	MW539-1	NA	858,000	**35.5[b]**	12.5	30	48	NA	NA	NA
MW539-1B	MW539-1	NA	1,730,000	**16**	13.5	23.5	39.7	NA	NA	NA
Historical Groundwater Results – BNI Field Investigation, January 1999 (BNI 2000c)										
175GW07	MW539-1	NA	38,000	**16**	10 U	22	45	NA	NA	100 U
175GW08	MW539-1	NA	41,000	**16**	10 U	23	45	NA	NA	100 U
Historical Groundwater Results – BNI Field Investigation, January 2001 (BNI 2001)										
208G143	539-MW1	610	72,000	**16**	2 U	13	NA	11	8	2 U
208G141	539-MW2	130	2,400	1 U	1 U	1 U	NA	1 U	1 U	1 U
208G142	539-MW3	100 U	3,800 J	1 UJ	1 UJ	1 UJ	NA	1 UJ	1 UJ	1 UJ
Historical Groundwater Results – BNI Field Investigation, June 2001 (BNI 2001)										
208G243	539-MW1	390	84,000	**10**	1	15	NA	12	8	1 U
208G241	539-MW2	100	2,600	1 U	0.5 J	1	NA	1 U	1 U	1 U
208G242	539-MW3	130	9,400	1 U	1 U	4	NA	1 U	1 U	1 J
Groundwater Results – BEI Field Investigation, October 2002										
C043G029	539-MW1	280 J	31,000	**12**	1.5	17	NA	13	8.3	0.5 U
C043G044 (FD)	539-MW1	400 J	34,000	NA	NA	NA	NA	NA	NA	NA
C043G030	539-MW2	100 U	1,200	0.4 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U
C043G031	539-MW3	100 U	1,700	0.4 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U
Groundwater Results – BEI Field Investigation, April 2003										
C043G106	539-MW1	NA	25,000	**6**	0.93 J	6.9	12	NA	NA	0.5 U
C043G107	539-MW2	NA	1,100	0.4 UJ	1.1 UJ	0.6 UJ	0.31 J	NA	NA	0.5 UJ
C043G108	539-MW3	NA	1,300	0.4 U	1.1 U	0.6 U	0.5 U	NA	NA	0.5 U

(table continues)

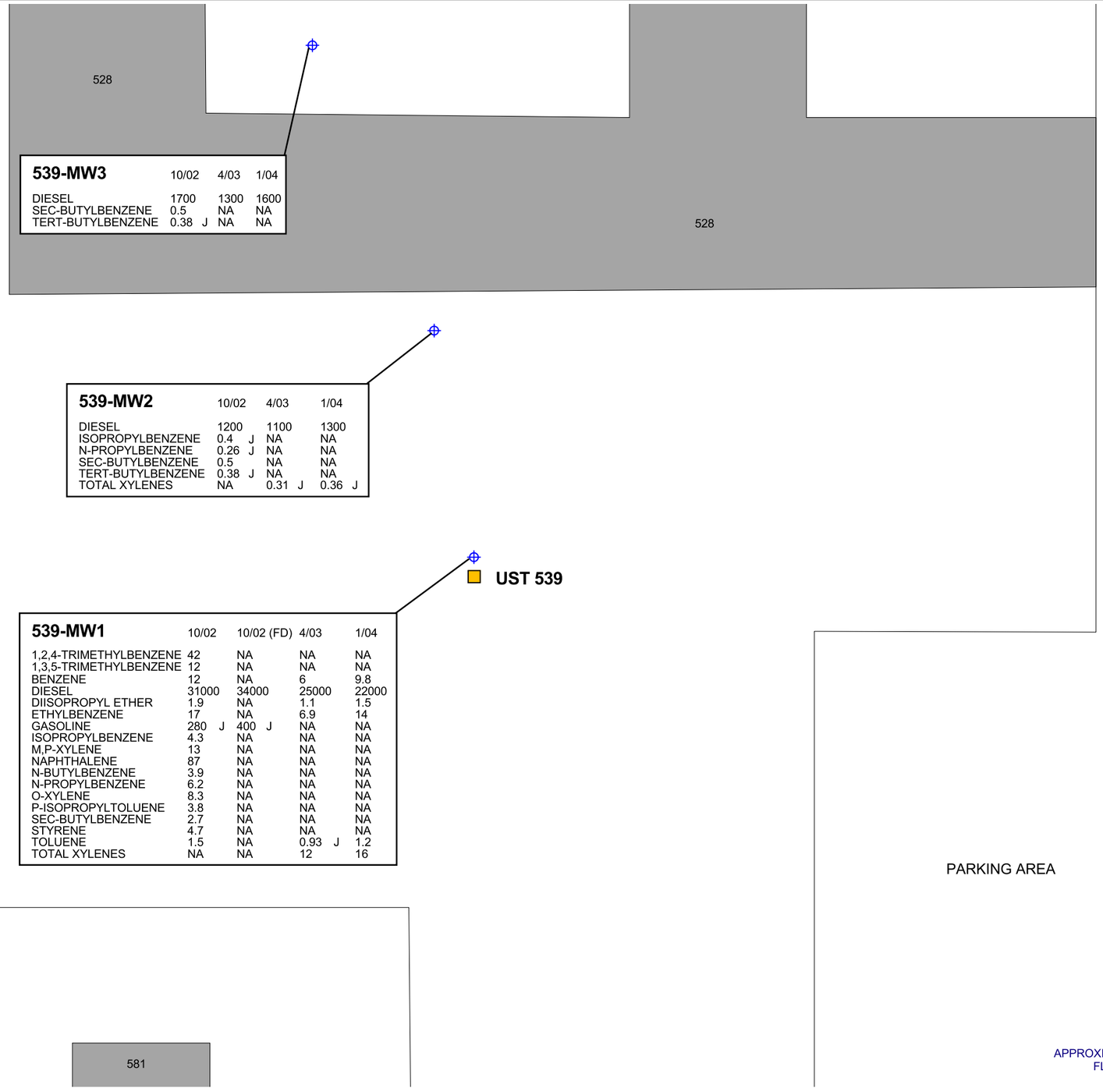
Table 5-3 (continued)

Sample ID	Well ID	TPH as Gasoline	TPH as Diesel	Benzene	Toluene	Ethylbenzene	Total Xylenes	m,p-Xylenes	o-Xylene	MTBE
Groundwater Cleanup Goals		**NE**	**NE**	**1.0**	**150**	**300**	**1,750**	**1,750**[a]	**1,750**[a]	**13**
Groundwater Results in BEI Field Investigation, January 2004										
C043G132	539-MW1	NA	22,000	**9.8**	1.2	14	16	NA	NA	0.5 U
C043G133	539-MW2	NA	1,300	0.4 U	1.1 U	0.6 U	0.36 J	NA	NA	0.5 U
C043G134	539-MW3	NA	1,600	0.4 U	1.1 U	0.6 U	0.5 U	NA	NA	0.5 U

Notes:
[a] groundwater cleanup goal is for total xylenes
[b] bold value indicates a result that is above the associated cleanup goal

Acronyms/Abbreviations:
BEI – Bechtel Environmental, Inc.
BNI – Bechtel National, Inc.
FD – field duplicate
JEG – Jacobs Engineering Group Inc.
MTBE – methyl tert-butyl ether
NA – not analyzed
NE – not established
TPH – total petroleum hydrocarbons
UST – underground storage tank

Review Qualifiers:
J – numerical value is an estimated quantity
U – not reported above the detection limit
UJ – analyte not reported above the detection limit; sample quantitation limit is an estimated quantity



LEGEND

- MONITORING WELL LOCATION
- FORMER UNDERGROUND STORAGE TANK
- ROAD
- BUILDING

WELL ID — DATE SAMPLED

539-MW3	10/02	4/03	1/04
DIESEL	1700	1300	1600
SEC-BUTYLBENZENE	0.5	NA	NA
TERT-BUTYLBENZENE	0.38 J	NA	NA

ANALYTE — CONCENTRATION IN ug/L — REVIEW QUALIFIER

NOTES:

FD - FIELD DUPLICATE

J - ESTIMATED VALUE

ug/L - MICROGRAMS PER LITER

NA - NOT ANALYZED

UST - UNDERGROUND STORAGE TANK

N

30 0 30 Feet

Annual Groundwater Monitoring Report

Figure 5-4

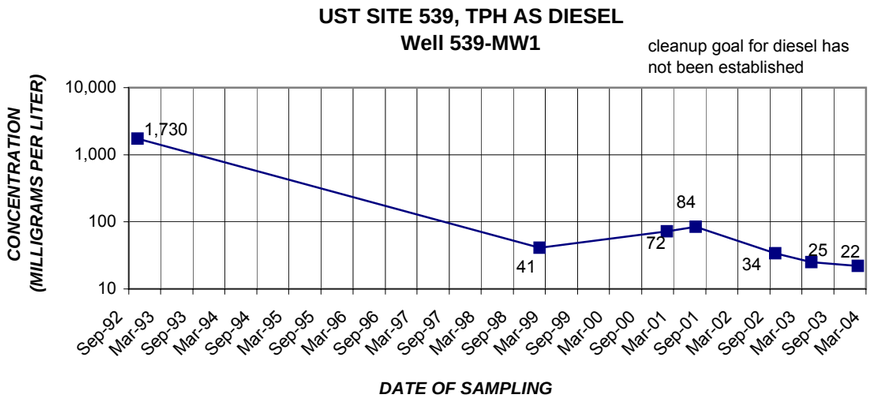
Site Layout and Groundwater Monitoring Results
UST Site 539

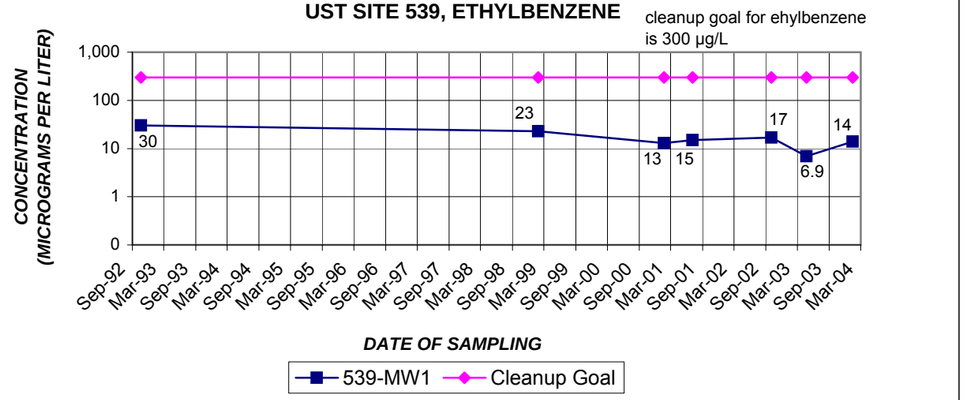
NAF El Centro, Imperial County, California

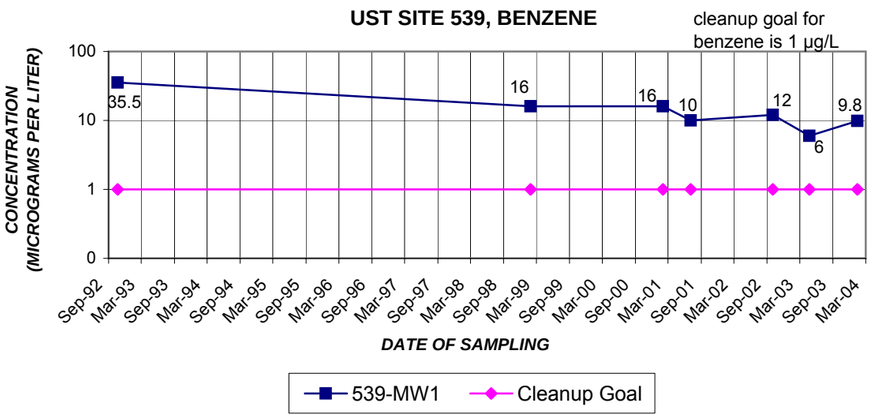
Bechtel Environmental, Inc.
CLEAN 3 Program

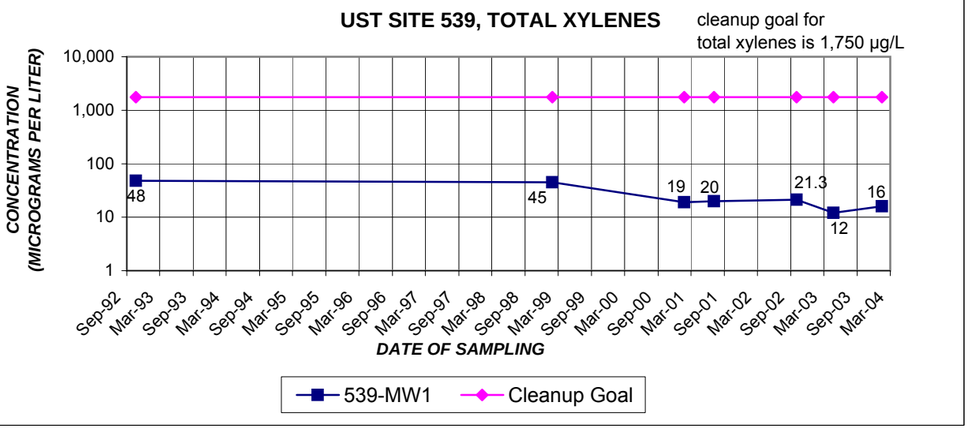
Date: 7/11/05
File No.: 043A13566
Job No.: 23818-043
Rev No.: E

Reserved for Figure 5-4 (11 × 17) page 2 of 2









Note:
Highest concentration graphed for duplicate results.

Annual Groundwater Monitoring Report

Figure 5-5

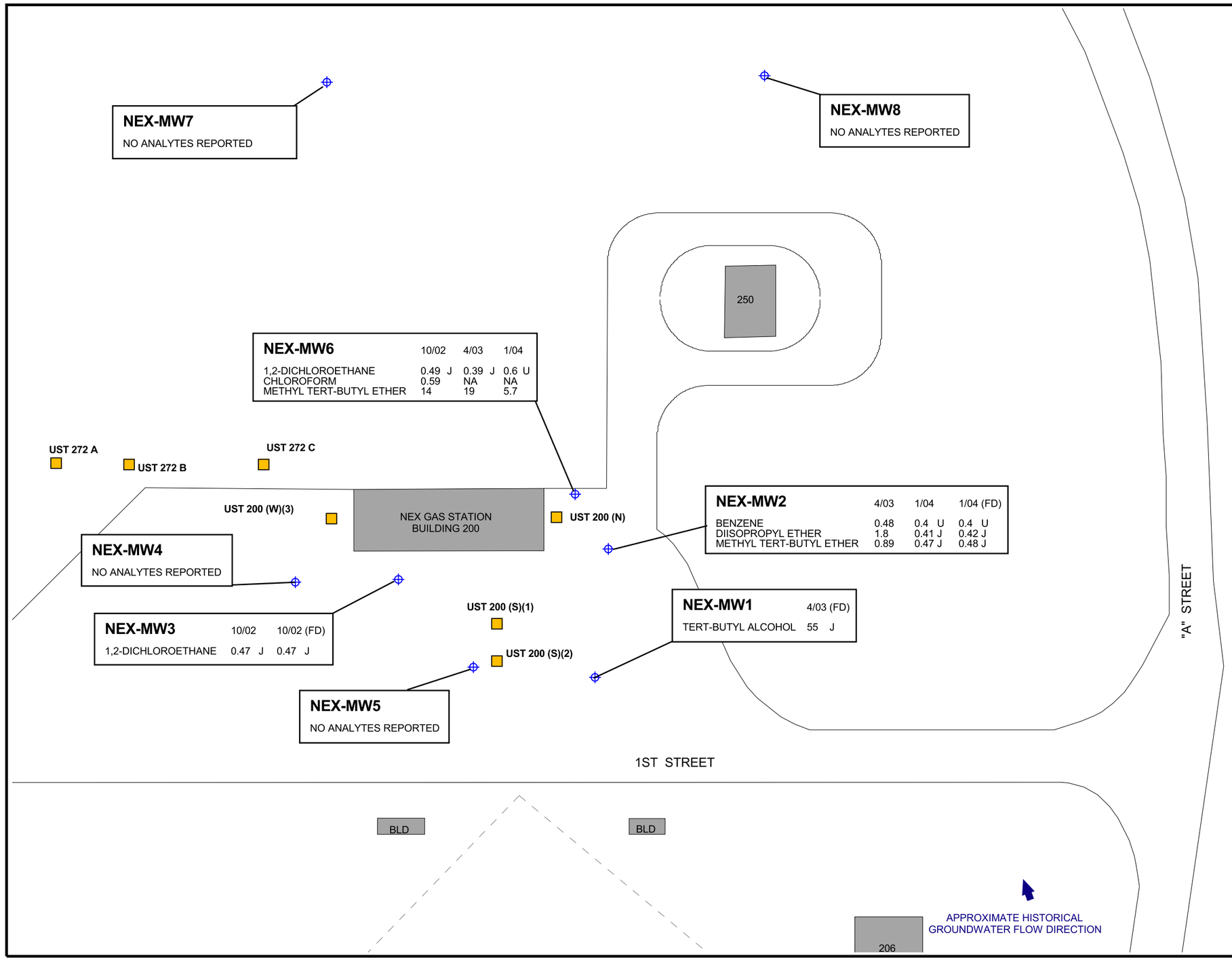
Diesel and VOC Concentrations Over Time – UST Site 539

NAF El Centro, Imperial County, California

Bechtel Environmental, Inc.
CLEAN 3 Program

Date: 6/29/05
File No.: See Footer
Job No.: 23818-043
Rev. No.: B

Reserved for Figure 5-5 (11 × 17) page 2 of 2



LEGEND

- MONITORING WELL LOCATION
- FORMER UNDERGROUND STORAGE TANK
- ROAD
- FENCE
- BUILDING

WELL ID — DATE SAMPLED

NEX-MW1 5/03 (FD)
TERT-BUTYL ALCOHOL 55 J

ANALYTE — CONCENTRATION IN ug/L — REVIEW QUALIFIER

NOTES:

FD - FIELD DUPLICATE

J - ESTIMATED VALUE

ug/L - MICROGRAMS PER LITER

NA - NOT ANALYZED

NEX - NAVY EXCHANGE

U - NOT DETECTED ABOVE REPORTING LIMIT

N

50 0 50 Feet

Annual Groundwater Monitoring Report

Figure 5-6

Site Layout and Groundwater Monitoring Results
UST Site 200 (NEX Gas Station)

NAF El Centro, Imperial County, California

Bechtel Environmental, Inc.
CLEAN 3 Program

Date: 9/27/05
File No.: 043A13567
Job No.: 23818-043
Rev No.: D

Reserved for Figure 5-6 (11 × 17) page 2 of 2

Table 5-4
Analytical Results for UST Site 200 (NEX Gas Station)
(reported in micrograms per liter)

Sample ID	Well ID	TPH as Gasoline	Benzene	Toluene	Ethylbenzene	Total Xylenes	m,p-Xylenes	o-Xylene	MTBE
Groundwater Cleanup Goals		**NE**	**1.0**	**150**	**300**	**1,750**	**1,750**[a]	**1,750**[a]	**13**
Historical Groundwater Results – JEG UST Site Investigation, June 1990 (JEG 1991)									
MW1-690	NEX-MW1	50 U	0.50 U	0.50 U	1.6	2.4	NA	NA	NA
MW2-690	NEX-MW2	280	**4.8**[b]	1.2	19	39	NA	NA	NA
MW3-690	NEX-MW3	150	**20**	4.4	10	13	NA	NA	NA
Historical Groundwater Results – JEG Site Assessment, June-July 1992 (JEG 1992)									
MW-1	NEX-MW1	5.0 U	0.30 U	0.30 U	4	2	NA	NA	NA
MW-2	NEX-MW2	5.0 U	**350**	2 U	**910**	1,200	NA	NA	NA
MW-3	NEX-MW3	5.0 U	**38**	1	10	7	NA	NA	NA
MW-4	NEX-MW4	5.0 U	0.30 U	0.30 U	0.30 U	0.60 U	NA	NA	NA
MW-5	NEX-MW5	5.0 U	**14**	28	64	530	NA	NA	NA
MW-5 FD	NEX-MW5	5.0 U	**11**	27	57	480	NA	NA	NA
MW-6	NEX-MW6	5.0 U	1	0.30 U	5	1	NA	NA	NA
Historical Groundwater Results – SOTA Environmental Technology, Inc., September 1997 (SOTA 1998)									
MW-1	NEX-MW1	50 U	0.30 U	0.30 U	0.30 U	0.60 U	NA	NA	10 U
MW-2	NEX-MW2	50 U	0.8	0.30 U	3.1	6.5	NA	NA	10 U
MW-3	NEX-MW3	50 U	0.30 U	0.30 U	0.30 U	0.60 U	NA	NA	10 U
MW-4	NEX-MW4	50 U	0.30 U	0.30 U	0.30 U	0.60 U	NA	NA	10 U
MW-5	NEX-MW5	50 U	0.30 U	0.30 U	0.30 U	0.60 U	NA	NA	10 U
MW-6	NEX-MW6	50 U	0.30 U	0.30 U	0.30 U	0.60 U	NA	NA	**130**
Historical Groundwater Results – BNI Field Investigation, January 1999 (BNI 2000c)									
175GW03	NEX-MW1	500 U	0.5 U	1 U	1 U	1 U	NA	NA	10 U
175GW02	NEX-MW2	500 U	0.5 U	1 U	1 U	1 U	NA	NA	10 U
175GW04	NEX-MW3	530	**2.7**	1 U	16	28	NA	NA	10 U

(table continues)

Table 5-4 (continued)

Sample ID	Well ID	TPH as Gasoline	Benzene	Toluene	Ethylbenzene	Total Xylenes	m,p-Xylenes	o-Xylene	MTBE
Groundwater Cleanup Goals		**NE**	**1.0**	**150**	**300**	**1,750**	**1,750**[a]	**1,750**[a]	**13**
Historical Groundwater Results – BNI Field Investigation, January 1999 (BNI 2000c) (continued)									
175GW05	NEX-MW4	500 U	0.5 U	1 U	1 U	1 U	NA	NA	10 U
175GW06	NEX-MW5	500 U	0.5 U	1 U	1 U	1 U	NA	NA	10 U
175GW01	NEX-MW6	500 U	0.5 U	1 U	1 U	1 U	NA	NA	**120**
175GW12	NEX-MW7	500 U	0.5 U	1 U	1 U	1	NA	NA	10 U
175GW11	NEX-MW8	500 U	0.5 U	1 U	1 U	1 U	NA	NA	10 U
Historical Groundwater Results – BNI Field Investigation, January 2001 (BNI 2001)									
208G144	NEX-MW1	100 U	**2**	2 U	2 U	NA	2 U	2 U	2 U
208G147	NEX-MW4	100 U	**2**	1 U	1 U	NA	1 U	1 U	1 U
208G149	NEX-MW6	100	**2**	2 U	2 U	NA	2 U	2 U	**79**
208G150	NEX-MW7	100 U	**4**	1 U	0.8 J	NA	1 U	1 U	1 U
208G151	NEX-MW8	100 U	**4**	1 U	0.8 J	NA	1 U	1 U	1 U
Historical Groundwater Results – BNI Field Investigation, June 2001 (BNI 2001)									
208G244	NEX-MW1	100 U	1 U	1 U	1 U	NA	1 U	1 U	1 U
208G247	NEX-MW4	100 U	1 U	1 U	1 U	NA	1 U	1 U	1 U
208G249	NEX-MW6	100 U	1 U	1 U	1 U	NA	1 U	1 U	**54**
208G250	NEX-MW7	100 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
208G251	NEX-MW8	100 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Groundwater Results – BEI Field Investigation, October 2002									
C043G032	NEX-MW1	100 U	0.4 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U
C043G033	NEX-MW2	100 U	0.4 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U
C043G034	NEX-MW3	100 U	0.4 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U
C043G045 (FD)	NEX-MW3	100 U	0.4 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U
C043G035	NEX-MW4	100 U	0.4 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U
C043G036	NEX-MW5	100 U	0.4 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U
C043G037	NEX-MW6	100 U	0.4 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	**14**
C043G038	NEX-MW7	100 U	0.4 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U

(table continues)

Table 5-4 (continued)

Sample ID	Well ID	TPH as Gasoline	Benzene	Toluene	Ethylbenzene	Total Xylenes	m,p-Xylenes	o-Xylene	MTBE
Groundwater Cleanup Goals		**NE**	**1.0**	**150**	**300**	**1,750**	**1,750**[a]	**1,750**[a]	**13**
Groundwater Results – BEI Field Investigation, April 2003									
C043G039	NEX-MW8	100 U	0.4 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U
C043G109	NEX-MW1	100 U	0.4 U	1.1 U	0.6 U	0.5 U	NA	NA	0.5 U
C043G110 (FD)	NEX-MW1	100 U	0.4 U	1.1 U	0.6 U	0.5 U	NA	NA	0.5 U
C043G111	NEX-MW2	100 UJ	0.48	1.1 U	0.6 U	0.5 U	NA	NA	0.89
C043G112	NEX-MW3	100 U	0.4 U	1.1 U	0.6 U	0.5 U	NA	NA	0.5 U
C043G113	NEX-MW4	100 U	0.4 U	1.1 U	0.6 U	0.5 U	NA	NA	0.5 U
C043G114	NEX-MW5	100 UJ	0.4 U	1.1 U	0.6 U	0.5 U	NA	NA	0.5 U
C043G115	NEX-MW6	100 UJ	0.4 U	1.1 U	0.6 U	0.5 U	NA	NA	**19**
C043G116	NEX-MW7	100 U	0.4 U	1.1 U	0.6 U	0.5 U	NA	NA	0.5 U
C043G117	NEX-MW8	100 U	0.4 U	1.1 U	0.6 U	0.5 U	NA	NA	0.5 U
Groundwater Results – BEI Field Investigation, January 2004									
C043G135	NEX-MW1	100 U	0.4 U	1.1 U	0.6 U	0.5 U	NA	NA	0.5 U
C043G136	NEX-MW2	100 U	0.4 U	1.1 U	0.6 U	0.5 U	NA	NA	0.47 J
C043G137 (FD)	NEX-MW2	100 U	0.4 U	1.1 U	0.6 U	0.5 U	NA	NA	0.48 J
C043G138	NEX-MW3	100 U	0.4 U	1.1 U	0.6 U	0.5 U	NA	NA	0.5 U
C043G139	NEX-MW4	100 U	0.4 U	1.1 U	0.6 U	0.5 U	NA	NA	0.5 U
C043G140 (FD)	NEX-MW4	100 U	0.4 U	1.1 U	0.6 U	0.5 U	NA	NA	0.5 U
C043G141	NEX-MW5	100 U	0.4 U	1.1 U	0.6 U	0.5 U	NA	NA	0.5 U
C043G142	NEX-MW6	100 U	0.4 U	1.1 U	0.6 U	0.5 U	NA	NA	5.7
C043G143	NEX-MW7	100 U	0.4 U	1.1 U	0.6 U	0.5 U	NA	NA	0.5 U
C043G144	NEX-MW8	100 U	0.4 U	1.1 U	0.6 U	0.5 U	NA	NA	0.5 U

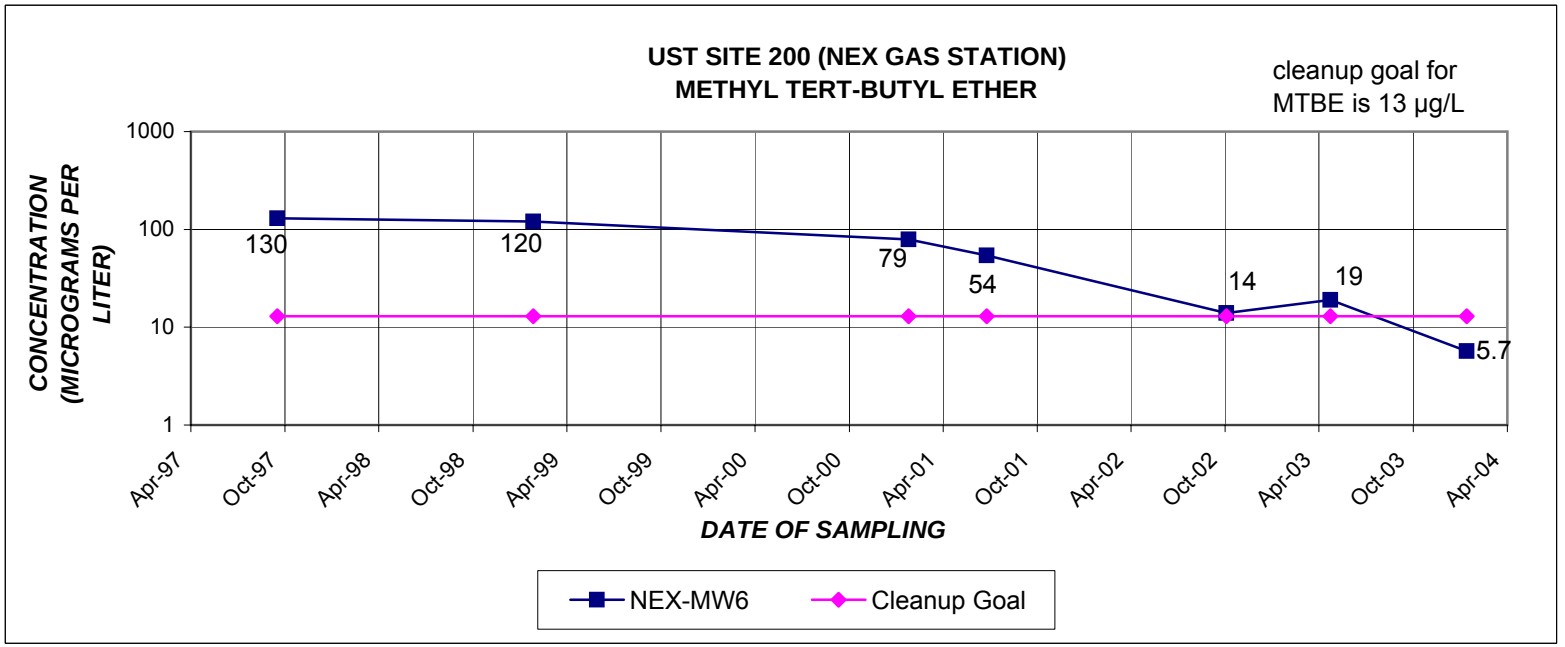
Notes:
[a] groundwater cleanup goal is for total xylenes
[b] bold value indicates a result that is above the associated cleanup goal

(table continues)

Table 5-4 (continued)

Acronyms/Abbreviations:
- BEI – Bechtel Environmental, Inc.
- BNI – Bechtel National, Inc.
- FD – field duplicate
- JEG – Jacobs Engineering Group Inc.
- MTBE – methyl tert-butyl ether
- NA – not analyzed
- NE – not established
- NEX – Navy Exchange
- TPH – total petroleum hydrocarbons

Review Qualifiers:
- J – numerical value is an estimated quantity
- U – not reported above the detection limit
- UJ – analyte not reported above the detection limit; sample quantitation limit is an estimated quantity



Annual Groundwater Monitoring Report

Figure 5-7

MTBE Concentrations Over Time –
UST Site 200 (NEX Gas Station)

NAF El Centro, Imperial County, California

Bechtel Environmental, Inc.
CLEAN 3 Program

Date: 6/29/05
File No.: See Footer
Job No.: 23818-043
Rev. No.: B

This page left blank intentionally

Section 6
REFERENCES

Agricultural Technical Service, Inc. 1990. Analytical Results for UST 533. October.

Amtech. *See* Amtech Laboratories.

Amtech Laboratories. 1990. Three soil samples; Demo Building 539, NAF El Centro. January.

ATS. *See* Agricultural Technical Service, Inc.

Bechtel Environmental, Inc. 2002. Technical Memorandum for Groundwater Sampling at Installation Restoration Sites 1, 2, 7, and 10 and Various Petroleum Sites, Naval Air Facility El Centro, California. April.

———. 2003a. Annual Groundwater Monitoring Report for 2002, IR Sites 2, 7, and 10, Naval Air Facility El Centro, California. April.

———. 2003b. Removal of Free Product Recovery System Installed in Well MW533-1, Naval Air Facility El Centro, El Centro, California. Letter to Naval Facilities Engineering Command. 13 November.

———. 2004. 2003 Annual Groundwater Monitoring Report for IR Sites 2, 7, and 10 and Facilitywide Background Wells, Naval Air Facility El Centro, El Centro, California. September.

Bechtel National, Inc. 2000a. Final Technical Memorandum, UST Site Investigation, Naval Air Facility, El Centro, California. March.

———. 2000b. Work Plan Soil and Groundwater Sampling at IR Sites 1, 2, 7, 10, 12, and 17 and Various Petroleum Sites, Naval Air Facility El Centro, California. July.

———. 2000c. Groundwater Monitoring Plan/Field Sampling Plan, Petroleum-Only Sites, Naval Air Facility El Centro, California. October.

———. 2000d. Tank Management Plan, Naval Air Facility El Centro. November.

———. 2001. Annual Groundwater Monitoring Report 2001 for Petroleum-Only Sites, Naval Air Facility El Centro, El Centro, California. November.

———. 2004. CLEAN Program Technical Specification for Analytical Laboratory Services. 22214-TS-002. April (or latest revision in effect at the time of analysis).

BEI. *See* Bechtel Environmental, Inc.

Boogay, M. A. 1990. Underground Storage Tank Investigation, Building No. 116, NAF El Centro. 07 May, with amendments made 27 August.

California Irrigation Management Information System. 2004. California Department of Water Resources Evapotranspiration Database. http://wwwcimis.water.ca.gov/cimis/welcome.jsp.

California Regional Water Quality Control Board. 2002. Water Quality Control Plan, Colorado River Basin – Region 7. May.

———. 2003. Cover letter transmitting applicable or relevant and appropriate requirements for Site 2. 24 January.

CIMIS. *See* California Irrigation Management Information System.

ECC. *See* Environmental Chemical Corp.

Environmental Chemical Corp. 1993. Naval Air Facility, El Centro, California. Contract No. N68711-91-C-0157.

Geofon. *See* Geofon, Inc.

Geofon, Inc. 2000. Final Technical Memorandum, Removal of Underground Storage Tanks and Remediation of Fuel-Impacted Soil at Various UST Sites, Naval Air Facility El Centro, California. November.

Jacobs Engineering Group Inc. 1991. UST Site Investigation, Final Report. Naval Air Facility, El Centro, California. February.

———. 1992. Site Assessment, NEX Gas Station, Final Report. Naval Air Facility, El Centro, California. August.

———. 1993. UST Site Assessment at Buildings 116, 533, and 539, Site Assessment Report. Naval Air Facility, El Centro, California. April.

JEG. *See* Jacobs Engineering Group Inc.

Kroeker. *See* Kroeker, Inc.

Kroeker, Inc. 1994. UST Removal Phase 2, NAF El Centro, Contract # N68711-93-C-1328. Test Results. January.

Norris, R.M., and R.W. Webb. 1976. *Geology of California*. New York: John Wiley and Sons. p. 365.

OHM. *See* OHM Remediation Services Corp.

OHM Remediation Services Corp. 1995. Draft Site Closeout Report, Volume 1, Former UST Sites Soil Removal. Naval Air Facility, El Centro, California. November.

RWQCB. *See* California Regional Water Quality Control Board.

SOTA. *See* SOTA Environmental Technology, Inc.

SOTA Environmental Technology, Inc. 1998. Final Report, Groundwater Monitoring Report, Building 200. Naval Air Facility, El Centro, California. January.

United States Environmental Protection Agency. 2000. Guidance for Data Quality Objectives Process. EPA QA/G-4. August.

U.S. EPA. *See* United States Environmental Protection Agency.